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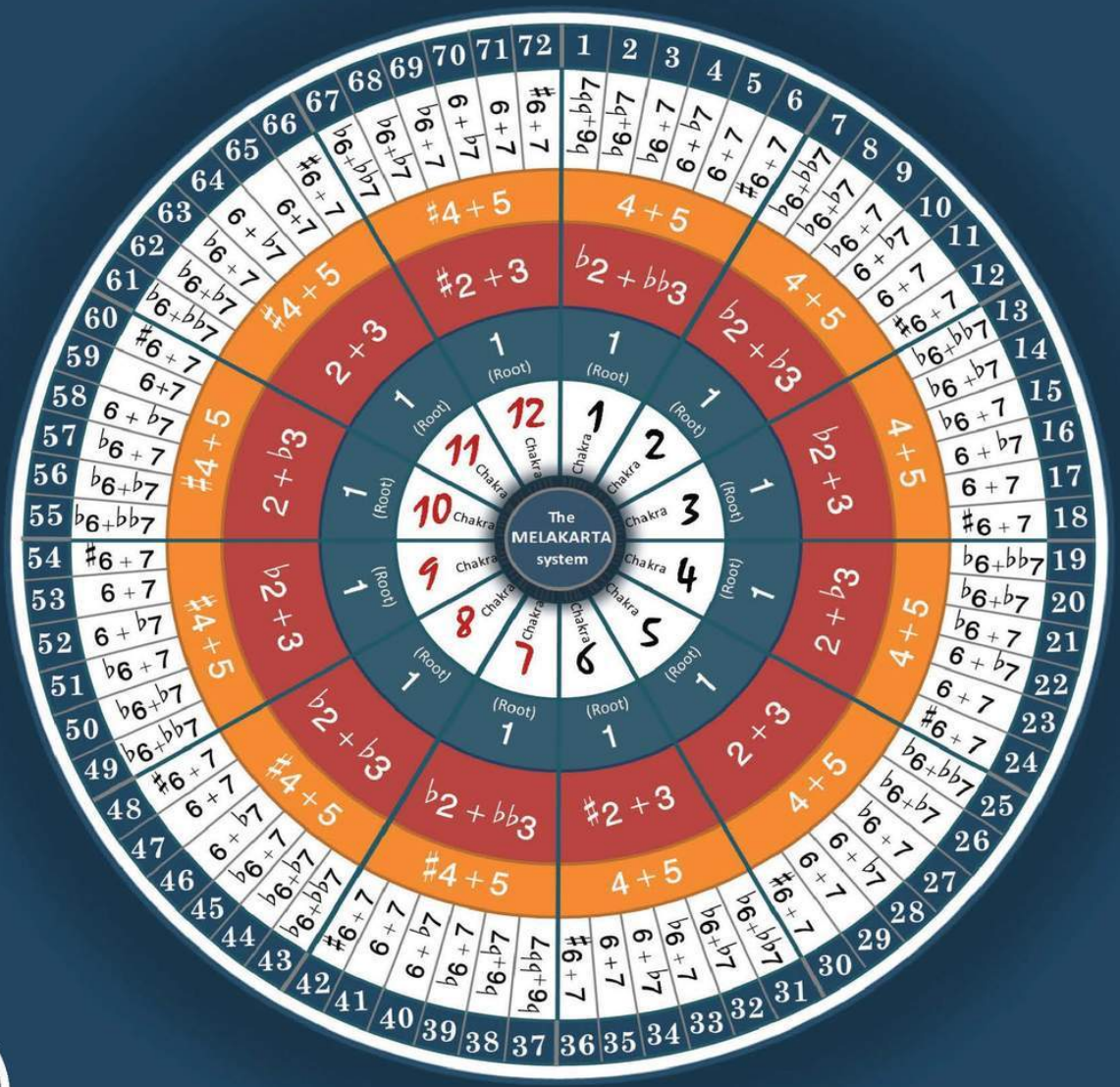
Elements of Indian Music

An Introduction to the Indian Melodic System of Music

THE MELAKARTA SYSTEM

by Radhika Iyer



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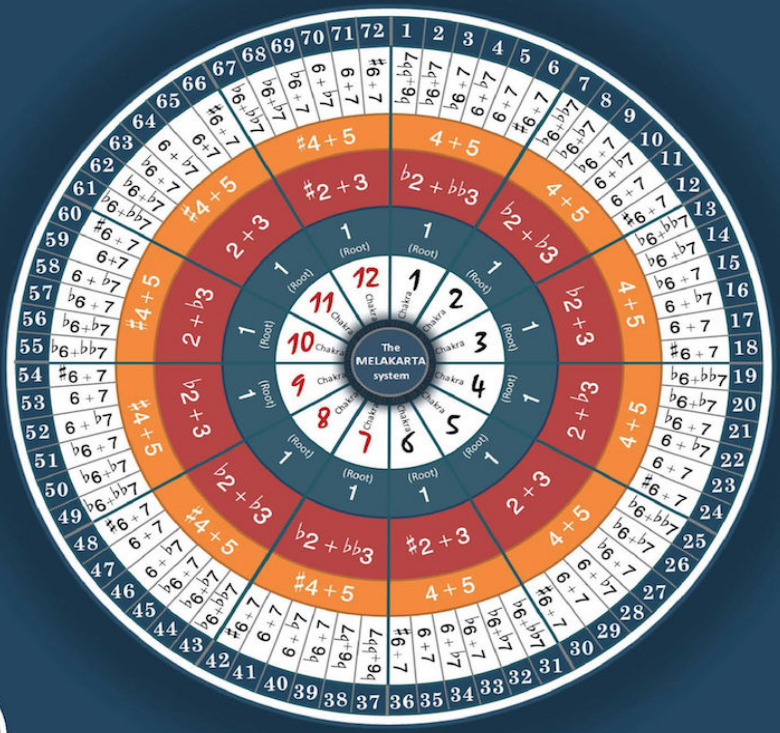

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Preface

Radhika Iyer's "Elements of Indian Music" provides a comprehensive explanation of the Carnatic (South Indian) Melakarta system of scale formation. The system is clearly explained both verbally and graphically in artistically beautiful and intellectually accessible diagrams.

Much as Nicolas Slonimsky did in his *Thesaurus of Scales and Melodic Patterns*, Iyer provides a rich palette of possibilities from which composers from any discipline can draw inspiration. This well thought out and organized compendium is supplemented with Iyer's own etudes set strictly, yet artistically within the Melakarta system.

These etudes offer an opportunity to explore Iyer's perspective on the intersection of Western and Carnatic music and serve as a jumping off point for composers and improvisers who wish to expand their harmonic and melodic vocabulary.

George Brooks
February 2018

Performance Credits

Piano Etudes (Solo)	-	Elizabeth Roper (session musician, recording artist)
Guitar Etudes (Solo)	-	Matt Bacon (Faculty, KM Music Conservatory, Chennai, India)
Guitar Etude in Melakarta #19 (Duet)	-	Matt Bacon & Rohit Kumar (student, KM Music Conservatory, Chennai, India)
Guitar Etude in Melakarta #59 (Duet)	-	Matt Bacon & Pratyaksh Sahu (student, KM Music Conservatory, Chennai, India)

Composed and Produced by Radhika Iyer

Acknowledgements

This book envisions a new archetype in music composition for composers of all music genres, for composition teachers, and for students of ethnomusicology who want to bring the best of Western harmonic and Indian melodic systems of music together, to take music composition to a new dimension.

The book is an unprecedented endeavor at introducing the Indian Melodic System of music to the West in a practically accessible manner, all within the realm of Western music theory. However, any kind of futuristic work requires an equally forward-thinking mind to trust its author. In that respect, I can't find enough words of gratitude to thank **Mr. William Bay** for trusting my vision and including this book in Mel Bay's exhaustive catalogue. I'd also like to thank Mr. Stephen Rekas for his guidance and well wishes every step of the way.

Additionally, I want to acknowledge four professional musicians trained in Western classical music, whose contributions have been pivotal to the evolution of this book.

- **Cathie Lowmiller** – Cathie initiated me into Western classical violin. She was always brimming with motherly warmth and love, and constantly kept urging me to "fly out of her nest." My initial impetus to write this book began when I started training with Ms. Cathie. She provided much needed encouragement when the book was still in its inception stage.
- **Daniel Wood** – I'm deeply indebted to Daniel, my piano teacher, and an acclaimed horn player from the San Francisco area. I have enjoyed every lesson with Daniel which was abundant with intellectual conversations on music theory between India and the West. Daniel painstakingly read sheets and sheets of etudes with unconventionally written progressions, and probably endured the maximum heavy-lifting of Indian scale-based studies. Daniel holds a degree from University of California (UCLA), runs a publishing house, teaches at the Community School of Music and Arts and also at the San Francisco Conservatory Pre-College Division where he is Chair of Musicianship & Composition.
- **Matt Bacon** – I'm extremely grateful to Matt, a classical guitar composer and recording artist. Matt undertook the very arduous and challenging task of transcribing the piano etudes for classical guitar and recording them. He immersed himself in the transcription process with profound introspection and purpose to help pioneer a style still novel to the West. Matt holds a Masters in Music from The San Francisco Conservatory of Music and is currently on the faculty at KM Music Conservatory, Chennai, India.
- **Elizabeth Roper** – Elizabeth is a phenomenal piano player from the San Francisco area who zealously embarked on the mission to record the piano etudes in this book. In a way, the scores had to pass her Western eye for sight-reading. Elizabeth's enthusiasm was very uplifting and kept reinforcing the vision of the book. Elizabeth holds a Masters in Music from The University of Maryland where she studied with Bradford Gowen. Elizabeth currently teaches piano and performs and records throughout the San Francisco area.

Lastly and importantly, my love and gratitude to my very traditional Indian mother who taught me Indian classical music. Her greatest support came through unconditional acceptance of my need for mental space and time to stay focused on completing this book.

Radhika Iyer

Introduction

By core training, I am an Indian classical violinist. But I had so much admiration for music from the West, I began taking lessons in Western classical violin and piano. It was during this time that I began observing how mature the harmonic system of music was in the West when compared to India in terms of theory and application; and in sharp contrast, the Indian melodic system of music was far more advanced when compared to the West.

Each time I played Bach, I would reminisce over what Bach might have done with a scale from India. In my head I would hear Bach-style arpeggios in Indian scales which transported me to awe-inspiring and pristine sonic landscapes. The potential of bringing together these two highly developed worlds of harmony and melody was so extraordinary, it set the vision of this book in motion. I began searching for works by other authors in hope to find manuscripts where these two systems were brought together in theory and practice, and not just literature. But I found none in circulation, and that's how the journey of this book began.

It is easy to infer why the West has not been able to tap extensively into the Indian Melodic System despite enormous advancements in music:

The popularity of Indian music in the West was influenced in the mid-sixties primarily by Indian classical musicians. Whatever was transferred through this cultural exchange has continued to be largely classical in nature, even to this day. Indian classical music has evolved beyond the traditional 12 tones; is melodically-centered, modally complex, micro-tonal, improvisational and subjective. It has been imparted traditionally from teacher to disciple and not via standard method books. Furthermore, Indian classical music is taught by ear, uses a different music solfege, and is not written in Western notation. Over time, Indian music came to be generally recognized by the West as micro-tonal music and became elusive in application in Western music genres founded on 12-tones. But at its core, Indian classical music has also evolved from 12 tones; and it's at this primal point where the two systems can unite.

When I began conceptualizing the book, I gave much thought to how I should introduce Indian music theory to the West in a manner that was coherent and immediately accessible to someone already grounded in Western musical concepts. The most logical approach seemed in laying out its 12-tone **Melodic Scale Framework** as a precursory starting point. The entire modal and micro-tonal evolution of Indian classical music rests on this very structured framework of scales.

- **The main focus of this book is to provide an introduction of the Indian melodic system of music to composers, musicians and students already trained in or training in Western music.**
- **The book can be utilized as a modus operandi by students of ethnomusicology, composition teachers and composers from all world music genres who wish to know and apply Indian melodic scales in Western classical or contemporary composition and improvisation.**

This book **will not** delve into core Indian classical music techniques. A few key terms and concepts have been explained for the benefit of readers, but terms relevant for specialized study of Indian classical music have been intentionally omitted from this book. Anyone desiring to pursue concentrated study of Indian classical music (North or South Indian) must train with a qualified teacher.

The Melodic Structure of Indian Music

Melakarta and Thaat

The Indian melodic system of music can be traced back to its roots which lie in Indian classical music, which is one of the most advanced styles of improvisational music, and consists of two main sub-genres –
South Indian classical (known as Carnatic/Karnatik) and **North Indian classical** (known as Hindustani).

The South and North Indian classical styles have distinctive micro-tonal characteristics, but their foundations are based on a framework of 12-tone heptatonic scales.

- South Indian music theory is rooted in a comprehensive system of 72-heptatonic scales called *The Melakarta System*.
- North Indian music theory is rooted in a system of 10 heptatonic scales called *The Thaat System*.

The Thaat System could be likened to a subset of the Melakarta System considering congruence between the sub-genres, i.e., different names for the same melodic scale. So, to keep it simple, this book will focus on the Melakarta framework while making references to Thaat wherever applicable.

- **Melakartas (and Thaats) form the most integral part of the Indian melodic system of music in present-day use.**
- **The Melakarta scales are based on 12 tones, analogous to the chromatic scale of the West, and can be functionally applied in any musical genre that is founded on 12 tones.**

These **72-parent scales** (including Thaats) are the foundations of all Indian classical repertoires in every known Indian scale or mode; and form the backbone of the signature microtonal music of India. Although many of the scales in this system are non-diatonic, the **Tonic**, the **Fourth** (P4 or +4) and the **Perfect Fifth** (P5) form a part of every scale in the set.

Raaga

The term **Raaga** ('aa' pronounced as in 'art' and not 'at') is unique to **Indian classical music,** but should not be used as a generic denotation for music from India.

By simple definition, a Raaga is that which is born out of a scale, namely a Melakarta, Thaat or its mode, but ruled by both **'Swara'** (tones) and **'Shruti'** (microtones). **Swara** connotes the notes of an octave within the 12-tone system, while **Shruti** refers to intervals smaller than a semitone detectable by the human ear (within the 22-microtone system).

In Indian classical music, two or more Raagas could share the exact same ***swaras*** (notes), but can still be clearly distinguished based on the microtone conveyed through note emphasis, register, transilience, intonation, ornamentation, and rules of ascent (Arohana) and descent (Avarohana) that separate them. To put it in perspective, there are at least 275 documented Raagas associated with the major scale alone (Melakarta #29), of which approximately a fourth are in use.

To summarize,

- **MELAKARTAS (and THAATS) ARE 12-TONE. RAAGAS ARE MICRO-TONAL.**
- **MANY RAAGAS CAN BE ASSOCIATED TO ONE MELAKARTA (or THAAT), THE CONVERSE IS NOT TRUE.**

The Melodic Structure of Indian Music

The Quintessence of Indian Music

So what makes Indian music so unique apart from just having many more scales, modes and raagas?

In the West, music composition is dominated by two fundamental scales (major and minor) **performed in different keys**; and the principles of chromaticism, modes and note alterations (*e.g. diminished 6th, flat 5th, sharp 2nd etc.*) are used to introduce accidentals to create and resolve tension in the music. Indian classical musicians on the contrary, make use of an expansive range of scales **performed in the same key** (throughout a concert) to create a similar effect of tension and release by exploiting the emotional verve of the scales.

The interval structure of every scale carries an emotional blueprint with it. In order to tap into a scale's emotive energy, a **scale-boundary rule** is followed, and this is what sets Indian classical music apart. No deviations are made into accidentals or notes not defined by the scale's '**krama**' (ascent/descent rule). This method of staying within the limits of a scale creates a powerful **'lock-in'** effect in both the performer and the listener, and begins to unravel deep emotional responses in both.

- **Scale-boundary is not an unfamiliar concept to the West. There are countless classical pieces written entirely in the major or minor scale. In India, the scale-boundary rule is characteristic of classical music and is applied to hundreds of scales, which adds to its emotional eloquence.**
- **The scale-boundary limit might be quite a novel archetype for Western classical and contemporary composers with respect to non-diatonic Indian scales, but is nonetheless a very potent one for composers looking for something fresh-sounding and intense in experience.**
- **Each etude in this book is composed in a unique Melakarta scale and follows the scale-boundary rule to demonstrate the sonic scape of such an approach to composition.**
- **This style of music not only creates a new manifesto for composition and improvisation, it actually expands the cognizance of the composer to a new kind of creative freedom and upsurge in imagination. The upsurge is unleashed as a result of the very restraint imposed by the scale boundary. The experience of 'expansion through restraint' is like learning to paint with a limited color palette. It fosters profound imagination.**

Adhering to the scale-boundary is not a rule for composing in Indian scales, it's just another archetype. It would certainly be worth experiencing the sweet yet incredible challenge of playing within the scale's periphery and training oneself to lock into any scale. With consistent practice, one can gradually develop mastery and finesse with improvising in a multitude of scales. The etudes in this book can be mastered by almost anyone in a fairly short amount of time.

- A set of 12 etudes for piano and transcriptions for classical guitar have been provided in this book. (To access audio files, look up the url on the title page in the FAQ pull down menu on the Mel Bay website and follow instructions).
- Piano etudes are all in the key of C, so that the interval variances between the scales can be clearly distinguished from each other with reference to the same tonic center. The etudes can be transposed to other keys.

The Melodic Structure of Indian Music

Congruence Between Musical Cultures

The world has been brought together by music in unprecedented ways. Understanding congruence between musical systems makes communication easy during cross-cultural collaborations. It broadens our musical horizons and makes music more relatable.

Although it is not exactly known when or how the congruence between musical cultures began, it is very inspiring to learn about similarities between India and the rest of the world, and how much of a pivotal place the Major scale and its relative modes occupy between cultures. The Circle of Fifths is said to have been invented in the late 1600s, which is about the same time as when the full Melakarta scale system was formulated.

While the list below is not exhaustive, it compares **prevalent heptatonic scales** common between India and the rest of the world. There are many other scales in the Indian, Greek, Spanish, Middle Eastern, European and Russian systems where more congruence remains to be discovered.

Heptatonic Scales with Fourth (P4 or +4) and Fifth (P5) Intervals

Melkarta	CARNATIC SYSTEM (South India)	WEST & Rest of the World	HINDUSTANI SYSTEM (North India)
Mela – 08	Hanuma-thOdi (as a parallel mode of Major)	Phrygian / Neapolitan Dorian scale	Bhairavi * Thaat
Mela – 09	DenukA	Neapolitan minor / Harmonic Phrygian scale	
Mela – 11	KOkila-priya	Phrygian Major scale	
Mela – 14	VakulA-bharanam	Phrygian Dominant / Spanish Phrygian scale	
Mela – 15	MAya-mAlava-gowlA	Double Harmonic scale	Bhairav * Thaat
Mela – 16	Chakra-vAham	Neapolitan Mixolydian scale	Ahir Bhairav
Mela – 17	SUrya-kAntam	Neapolitan Major scale	
Mela – 20	Nata-Bhairavi (as a parallel mode of Major)	Natural minor scale	AsAvari * Thaat
Mela – 21	Keera-vAni	Harmonic minor scale	Kirvani
Mela – 22	Kara-hara-priya (as a parallel mode of Major)	Dorian scale	KAfi * Thaat
Mela – 23	Gowri- manOhari	Jazz minor scale	
Mela – 26	ChAru-kesi	Major-Minor scale	ChArukesi
Mela – 27	Sara-sAngi	Harmonic Major scale	Nata-bhairav
Mela – 28	Hari-kAmboji (as a parallel mode of Major)	Mixolydian scale	Khamaj * Thaat
Mela – 29	**Dheera-ShankarA-bharanam**	**Major scale**	**BilAval * Thaat**
Mela – 34	VAga-deeshwari	Mixolydian sharp second scale	
Mela – 45	Shuba-panthu-varAli		ThOdi * Thaat
Mela – 51	KAma- vardhini		PUrvi * Thaat
Mela – 53	GamanA-shrama		MArwa * Thaat
Mela – 56	Shanmukha-priya	Hungarian Minor I scale / Natural minor with raised 4th	
Mela – 57	Simhendra-madhyamam	Hungarian Minor II scale / Harmonic minor with raised 4th	
Mela – 58	Hema-vathi	Romanian / Ukranian Dorian scale	
Mela – 59	Dharma-vathi	Lydian Dimished scale	Ambika
Mela – 62	Rishabha-priya	Lydian Minor scale	
Mela – 64	VAchaspathi	Acoustic scale	
Mela – 65	Mecha-KalyAni (as a parallel mode of Major)	Lydian scale	Kalyan * Thaat
Mela – 70	NAsika-bUshani	Hungarian Major I scale	
Mela – 71	KOsalam	Hungarian Major II scale	

For scales from India, pronounce capital A,O,U like extended vowels: A as in 'Art' and not 'At', O in 'Oath' and not 'Of', U in 'Zoo' and not 'Us'

Fig.1

Indian Theory vs. Western Theory – A Unified Approach

Key Signatures and Time Signatures

The principle of Western standard key signatures was developed from the Circle of Fifths which represents notes of the Major scale in 12 keys. In other words, the standard key signature map works for only 1 scale – The Major scale or its diatonic modes.

Many of the **Melakarta** scales (including North Indian Thaats) are non-diatonic. Therefore, developing key signatures for all these scales is bound to lead to imminent challenges.

- Some scales could have both sharps and flats while others might have double sharps and double flats in some keys.
- There may be no recognizable sequence of sharps or flats unlike in the Circle of Fifths (e.g. ♯, ♯♯, ♯♯♯, ♭, ♭♭, ♭♭♭ etc).
- There will be too many key signature variations to remember for a multitude of scales which is neither practical nor necessary.

- A simple alternative to key signatures for Indian scales is to notate the **Tonic** and the **Scale Signature** (scale formula in scale degrees or staff notes) just above the tempo markings (e.g. Tonic=C, Scale Signature=C,D,E,F,G,A♭,B,C).
  This serves the same purpose as key signatures as it indicates the sharps or flats pertinent to a scale; and can be extended to any number of scales. Staff notes follow the scale signature.
- If composers wish to use Western standard key signatures for Indian non-diatonic scales, then the score might have more accidentals to read. Composers can exercise discretion and notate the music as deemed fit to make sight-reading easy.
- In the case of key changes (same scale, different key) or scale changes (same key, different scale) in the middle of a score, similar Tonic or Scale signature markings can be placed just above the measure where the change begins.
- It is theoretically possible to develop complex key signatures for Indian scales, but it will serve no practical purpose.

Time Signatures

Time signature markings will follow prevailing Western standards.

Indian Theory vs. Western Theory – A Unified Approach

Staff Position, Scale Degrees, Intervals and Scale-Chord Compatibility

To determine a consistent theoretical standard for notating and composing in Indian scales (within the setting of Western music theory), the four concepts of NOTE-STAFF-POSITION, SCALE-DEGREES, INTERVALS and SCALE-CHORD COMPATIBILITY need to be considered simultaneously.

In Western music theory, which is centered principally around diatonic scales (e.g., the C-Major scale), there is a one-to-one correspondence between **staff position of the notes** (C,D,E,F,G,A,B), **scale-degrees** (or diatonic number 1,2,3,4,5,6,7) and **intervals** (PU-Perfect Unison, M2-Major 2nd, M3-Major 3rd, P4-Perfect 4th etc.). This correspondence helps to link the melodic aspect of the scale to its harmonic aspect. The concept of correspondence between the scale-tones and the scale chords can be termed the **scale-chord compatibility** principle.

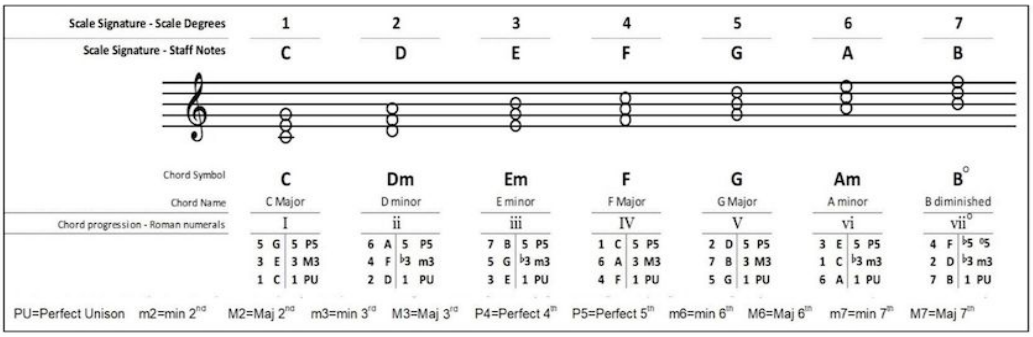


Fig.2

Scale-chord compatibility suggests that a scale's basic harmonic structure is derived from its staff notes (scale tones) whereby,

- Each scale-degree becomes the root of its own chord (1=C-Maj , 2 =D-min , 3=E-min, 4=F-Maj etc)
- A 'step' succession of notes along the scale's degree (1-3-5/CEG, 2-4-6/DFA, 3-5-7/EGB etc.) outlines its harmonic trajectory or its linear scale-chord progression (**C**-**D**m-**E**m-**F**-**G**-**A**m-**B**^{0})
- The linear chord progression is then used to develop more advanced chord progression sequences for the scale (I-IV-V, ii-V-I, I-vi-IV-V etc).
- The scale and the chords can be expressed as either intervals from the scale-root (PU,M2,M3,P4,P5,M6,M7) or as intervals from the chord-root (I=Major chord / PU-M3-P5 , ii=minor chord / PU-m3-P5 , vii^{0}= dim chord /PU-m3-^{0}5)
- With respect to the major scale and its diatonic modes, this logic works consistently in any key.

Music, however, has evolved beyond diatonic scales. New theoretical standards are being developed and continue to shape existing theory. In jazz scale theory for example, the principle of **chord-scale compatibility** is built on the idea that a sequence of chords will generate a sequence of compatible scales. A four-chord jazz progression may use four different scales as a result of chordal alterations.

Staff Position, Scale Degrees, Intervals and Scale-Chord Compatibility (continued)

In summary, whether a scale is built from chord progressions or chord progressions are built from a scale, the underlying principle is imperative – **The staff-notes of a scale must be able to 'talk to' the chords which characterize its harmonic structure, because that is the basis of harmonic theory.**

For Melakarta scales, the scale formulae have been designed keeping in mind the principle of scale-chord compatibility across various keys, so that the initial foundations for their harmonic structure is laid out upfront.

In Indian scale theory, the scale can dictate the sequence of compatible chords (like diatonic scale chord theory), or similar to jazz, compatible scales can be chosen for any sequence of chords (from an exhaustive repository of Indian scales).

Since many Melakarta scales are non-diatonic, the mutual correspondence between Staff notes, Scale degrees, Intervals and Scale-chords will work only if two conditions can be simultaneously satisfied:

1. There is representation of one scale degree number (and interval) per staff-note of the scale.
2. The scale degree (or the interval) does not lead to a double-flat or double-sharp note in the chosen key.

Double flats and double sharps will interfere with the scale-chord compatibility principle. In Western music theory, these notes are considered **altered intervals** and don't form chord roots (e.g., One does not refer to the D-major chord as E$^{\flat\flat}$-major chord even if the scale degree would convey an E$^{\flat\flat}$ staff note).

In Melakarta scales, the double-flat or the double-sharp note will need to be replaced by its enharmonic equivalent interval, so that staff notes can then *communicate* with the underlying scale-chords.

There are two possible situations which can lead to altered staff-notes in Melakarta scales:

1. **Scale Specific**: Scales with a Diminished Third ($\flat\flat$3), a Diminished Seventh ($\flat\flat$7), an Augmented Second ($\sharp$2) or an Augmented Sixth ($\sharp$6) tend to cause double flats or double sharps in most keys; or lead to theoretical notes like A$^{\sharp}$, D$^{\sharp}$ E$^{\sharp}$ B$^{\sharp}$, F$^{\flat}$ which are inconsistent with prevailing chord-theory.
   - At the discretion of the composer, enharmonic replacement is encouraged (not a pre-requisite), if the composition is scale-bound. This will allow staff notes and chord notation to align with each other, and will minimize the recurrence of double-flats/double-sharps throughout the score which could make sight-reading inconvenient.
2. **Key specific**: Occasionally, a scale might lead to an altered staff note in one key but not in another key, as shown in the scale-chord compatibility illustration for Melakarta Scale #16 (Fig.3 and Fig.4). The Key of A$^{\flat}$ is one such key.
   - A different key can be chosen in this situation. Refer to the **Circle of Intervals** chart to determine optimal keys for Indian scales.

If the application of the Indian scale is to introduce melodic phrases like *accidentals* in the music, then enharmonic replacement is optional.

Staff Position, Scale Degrees, Intervals and Scale-Chord Compatibility (continued)

Here is an illustrative example of a key-specific situation for Melakarta scale #16, where enharmonic note replacement will be needed in the Key of A♭, but not in the Key of C for the scale-chord compatibility to work.

Melakarta #16 - Chakravakam (Key of C) –

No enharmonic replacement is required.

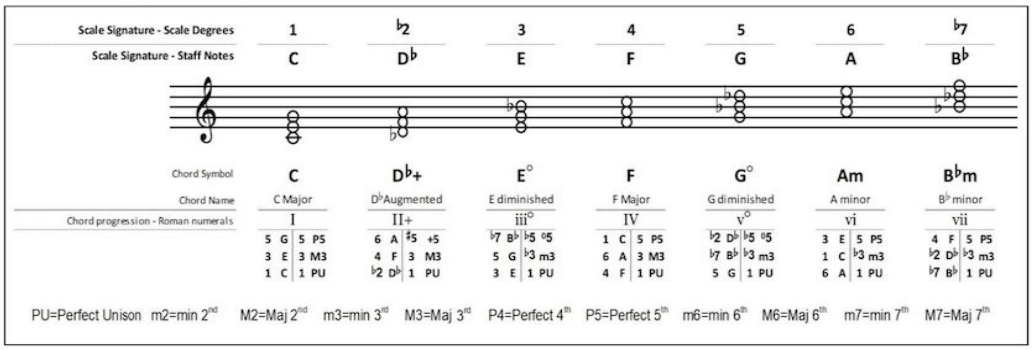


Fig.3

Melakarta #16 - Chakravakam (Key of A♭) –

Enharmonic replacement is recommended for the minor 2nd interval, from B♭♭ to A, so that scale tones align to scale chords.

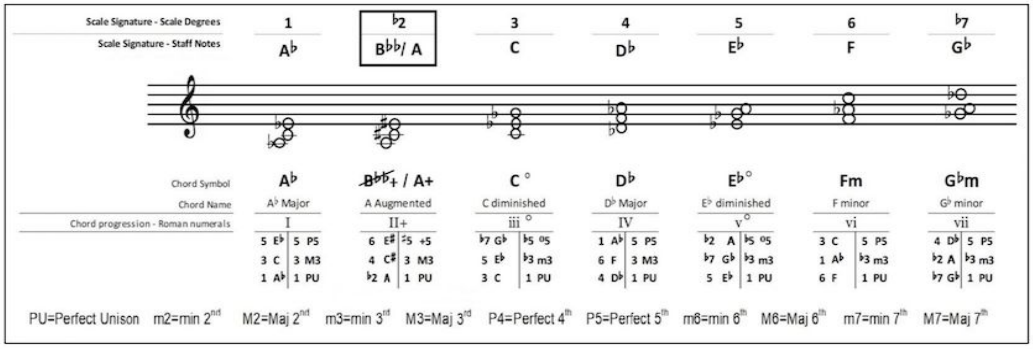


Fig.4

Refer to the **Circle of Intervals** chart to determine optimal keys for composition in Indian scales.

Standard & Adjusted Scale degrees for Melakarta Scales

Formulas for the Melakarta scales are provided in two different methods –

- **Standard scale degrees** – One scale degree number assigned to each note of the scale.
- **Adjusted scale degrees** – Scales with Diminished and Augmented intervals (except Augmented 4th) are replaced with an enharmonic equivalent interval to enable the scale-chord compatibility principle to work. These **adjusted** scales are very easy to recognize in the Melakarta chart as the scale degrees will show a **chromatic sequence** of ♭2-2 / ♭6-6 in place of ♭2-♭♭3 / ♭6-♭♭7 and ♭3-3 / ♭7-7 in place of ♯2-3 / ♯6-7.

– The **adjusted scale degree** method is particularly resilient when one has to remember a large number of scales and intellectualize the interaction between melody and harmony across various keys without having to depend a great deal on written theory.

– This method *normalizes* all the Melakarta scales into three main types of intervals: **major, minor** and **perfect** by levelling out all other diminished and augmented intervals through enharmonics (excluding the Augmented 4th).

– When a scale gets represented as a combination of just **major**, **minor** and **perfect** intervals, then staff notes and chords become very intuitive in any key. Once the basic scale-chords are identified, then altered-chords (augmented, diminished) and compound chords (ninth, eleventh, thirteenth etc) can be easily deciphered.

To summarize this section,

- The choice of key and the choice of scale will need to be judicious, similar to common Western practice. The **Circle of Intervals** is designed to help composers choose an optimal key for Indian scales.
- In scale-based compositions, enharmonic replacement is strongly encouraged for scales which have the following intervals: Diminished Third (♭♭3), Diminished Seventh (♭♭7), Augmented Second(♯2) and Augmented Sixth (♯6), especially if it causes double-flat or double-sharp staff notes. Aligning to the scale-chord compatibility principle will remove ambiguities in the way music is scored and will make sight reading easy.
- For the use of Indian scales in an *accidental* context, the enharmonic replacement of altered intervals is optional since the accidental notes are not expected to keep recurring frequently.
- Ultimately, the composer can exercise personal preference on how the score needs to be notated. Both ways of notating the scale (Standard or Adjusted degrees) are completely acceptable, as long as the score indicates the Tonic and the Scale signature, and can be comfortably sight-read.

Indian Theory vs. Western Theory – A Unified Approach

Approach to Chords

The *harmonic* system of the West is very well developed and theorized; in contrast, the *melodic* system of India is very advanced and established. The coming together of these two worlds can inspire exceptional sonic landscapes when both sides identify suitable common ground to build a unified theory of harmony and melody.

The ideal approach to chords for Indian scales, is to utilize existing Western chord theory and then supplement the theory with what is not covered by the West (e.g., chord progressions for Indian scales)

- The previous sections weighed on how Melakarta scales could be established within the framework of staff notes, intervals, scale degrees and scale-chord principles – so that they can be notated in Western format.
- The Melakarta scale-signatures (Adjusted Scale degree method) are designed to help build a harmonic footing for Indian scales in a manner which concurs with conventional scale-chord theory.
- Chord names, chord symbols, chord formulae and even altered and compound chord notations will follow prevailing Western theory.
- The melody will follow the staff notes.
- Advanced chord progression for Indian scales is an extensive topic and a large body of work worthy of further research.

Here is an example of how different chords would be notated for a Melakarta scale per Western chord theory:

Scale	:	Melakarta #59 in the Key of C
Scale Formula	:	1, 2, ♭3, ♯4, 5, 6, 7
Staff Notes	:	C, D, E♭, F♯, G, A, B
Chords	:	Cdim = CE♭G♭ (1-♭3-♭5), F♯dim=F♯AC (1-♭3-♭5) DMaj = DF♯A (1-3-5)
		E♭dim = E♭G♭A (1-♭3-♭5), BMaj=B D♯F♯ (1-3-5) $Cmi^{(MA9)}$ = CE♭GBD (1-♭3-5-7-9)

As illustrated above, the F♯ staff-note is written as G♭ for some chords (even though there is no G♭ in the scale signature). This is because chords follow chord formulae from the chord-root (e.g. Major 3^{rd} = F# for D Major chord with chord formula 1-3-5, Diminished 5^{th} = G♭ for C-dim chord with chord formula 1-♭3-♭5). A similar logic would apply for the E♭ staff note which would be written as D# in the B Major chord.

The **Circle of Intervals** is cognizant of chord principles.

THE CIRCLE OF INTERVALS

PU	(+1)/m2	M2/(⁰3)	(+2)/m3	M3	P4	+4/(⁰5)	P5	(+5)/m6	M6/(⁰7)	(+6)/m7	M7
C	C♯/D♭	D/(E𝄫)	(D♯)/E♭	E	F	F♯/(G♭)	G	(G♯)/A♭	A/(B𝄫)	(A♯)/B♭	B

PU	(+1)/m2	M2/(⁰3)	(+2)/m3	M3	P4	+4/(⁰5)	P5	(+5)/m6	M6/(⁰7)	(+6)/m7	M7
F	(F♯)/G♭	G/(A𝄫)	(G♯)/A♭	A	B♭	B/(C♭)	C	(C♯)/D♭	D/(E𝄫)	(D♯)/E♭	E

PU	(+1)/m2	M2/(⁰3)	(+2)/m3	M3	P4	+4/(⁰5)	P5	(+5)/m6	M6/(⁰7)	(+6)/m7	M7
G	(G♯)/A♭	A/(B𝄫)	(A♯)/B♭	B	C	C♯/(D♭)	D	(D♯)/E♭	E/(F♭)	(E♯)/F	F♯

PU	(+1)/m2	M2/(⁰3)	(+2)/m3	M3	P4	+4/(⁰5)	P5	(+5)/m6	M6/(⁰7)	(+6)/m7	M7
B♭	(B)/C♭	C/D𝄫	(C♯)/D♭	D	E♭	E/(F♭)	F	(F♯)/G♭	G/(A𝄫)	(G♯)/A♭	A

PU	(+1)/m2	M2/(⁰3)	(+2)/m3	M3	P4	+4/(⁰5)	P5	(+5)/m6	M6/(⁰7)	(+6)/m7	M7
D	(D♯)/E♭	E/(F♭)	(E♯)/F	F♯	G	G♯/(A♭)	A	(A♯)/B♭	B/(C♭)	(B♯)/C	C♯

PU	(+1)/m2	M2/(⁰3)	(+2)/m3	M3	P4	+4/(⁰5)	P5	(+5)/m6	M6/(⁰7)	(+6)/m7	M7
E♭	E/F♭	F/(G𝄫)	(F♯)/G♭	G	A♭	A/(B𝄫)	B♭	(B)/C♭	C/(D𝄫)	(C♯)/D♭	D

PU	(+1)/m2	M2/(⁰3)	(+2)/m3	M3	P4	+4/(⁰5)	P5	(+5)/m6	M6/(⁰7)	(+6)/m7	M7
A	(A♯)/B♭	B/(C♭)	(B♯)/C	C♯	D	D♯/(E♭)	E	(E♯)/F	F♯/(G♭)	(F×)/G	G♯

PU	(+1)/m2	M2/(⁰3)	(+2)/m3	M3	P4	+4/(⁰5)	P5	(+5)/m6	M6/(⁰7)	(+6)/m7	M7
A♭	A/(B𝄫)	B♭/(C𝄫)	(B)/C♭	C	D♭	D/(E𝄫)	E♭	(E)/F♭	F/(G𝄫)	(F♯)/G♭	G

The key of A♭ will lead to a double-flat for any Melkarta scale with a minor second. Use enharmonic replacement or choose a different key.

PU	(+1)/m2	M2/(⁰3)	(+2)/m3	M3	P4	+4/(⁰5)	P5	(+5)/m6	M6/(⁰7)	(+6)/m7	M7
E	(E♯)/F	F♯/(G♭)	(F×)/G	G♯	A	A♯/(B♭)	B	(B♯)/C	C♯/(D♭)	(C×)/D	D♯

PU	(+1)/m2	M2/(⁰3)	(+2)/m3	M3	P4	+4/(⁰5)	P5	(+5)/m6	M6/(⁰7)	(+6)/m7	M7
C♯	(C×)/D	D♯/(E♭)	(D×)/E	E♯	F♯	F×/(G)	G♯	(G×)/A	A♯/(B♭)	(A×)/B	B♯
D♭	(D)/E𝄫	E♭/(F𝄫)	(E)/F♭	F	G♭	G/(A𝄫)	A♭	A/(B𝄫)	B𝄫/(C𝄫)	(B)/C♭	C

The keys of C♯ and D♭ can lead to multiple double-sharps/double-flats for some non-diatonic Indian scales. Use enharmonic replacements or choose a different key.

PU	(+1)/m2	M2/(⁰3)	(+2)/m3	M3	P4	+4/(⁰5)	P5	(+5)/m6	M6/(⁰7)	(+6)/m7	M7
B	(B♯)/C	C♯/(D𝄫)	(C×)/D	D♯	E	E♯/(F)	F♯	(F×)/G	G♯/(A𝄫)	(G×)/A	A♯
C♭	(C)/D𝄫	D𝄫/(E𝄫𝄫)	(D)/E𝄫	E𝄫	F𝄫	F/(G𝄫)	G𝄫	(G)/A𝄫	A𝄫/(B𝄫𝄫)	(A)/B𝄫	B𝄫

The keys of C♭ and B can lead to multiple double sharps/double flats for some non-diatonic Indian scales. Use enharmonic replacements or choose a different key.

PU	(+1)/m2	M2/(⁰3)	(+2)/m3	M3	P4	+4/(⁰5)	P5	(+5)/m6	M6/(⁰7)	(+6)/m7	M7
F♯	(F×)/G	G♯/(A♭)	(G×)/A	A♯	B	B♯(C)	C♯	(C×)/D	D♯/E♭	(D×)/E	E♯
G♭	(G)/A𝄫	A♭/(B𝄫𝄫)	(A)/B𝄫	B𝄫	C♭	C/(D𝄫𝄫)	D𝄫	D/(E𝄫𝄫)	E♭/(F𝄫𝄫)	E/(F♭)	F

The keys of F♯ and G♭ can lead to multiple double-sharps/double-flats for some non-diatonic Indian scales. Use enharmonic replacements or choose a different key.

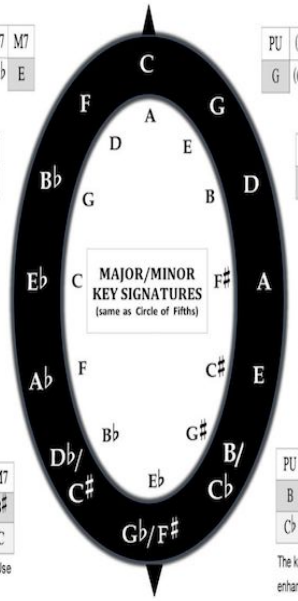


Fig.5

1	♯1	♭2	2	♯2	𝄫3	♭3	3	4	♯4
PU=Perfect Unison	+1=Augmented Unison	m2=Minor 2nd	M2=Major 2nd	+2=Augmented 2nd	⁰3=Diminished 3rd	m3= Minor 3rd	M3=Major 3rd	P4=Perfect 4th	+4=Augmented 4th

♭5	5	♯5	♭6	6	♯6	𝄫7	♭7	7
⁰5=Diminished 5th	P5=Perfect 5th	+5=Augmented 5th	m6=Minor 6th	M2=Major 6th	+6=Augmented 6th	⁰7=Diminished 7th	m3= Minor 7th	M3=Major 7th

The Circle of Intervals

- **The Circle of Intervals is an innovative concept developed to supplement existing Western music theory, and to embrace more diatonic and non-diatonic music from India.**
- **The main difference between the Circle of Fifths (CoF) and the Circle of Intervals (CoI) is that, if CoF maps the major scale intervals in 12 keys, CoI maps all the intervals within an octave in 12-keys.**
- **The Circle of Intervals is by design, layered atop the Circle of Fifths so that they fully complement each other.**

How to use the Circle of Intervals to determine Melakarta scale staff-notes:

Take any Melakarta scale (given in scale degrees on the Melakarta chart) and map it to the Circle of Intervals in any desired key to get the corresponding staff notes. Composers can use either Standard scale degrees or Adjusted scale degrees to determine staff-notes for these scales. Any Indian scale can be mapped in the same way.

Other advantages of the Circle of Intervals (CoI):

- **CoI** eliminates guesswork on which key to use for which Indian scale. This is particularly helpful in the absence of key signatures where Tonic and Scale signature markings are vital.
- **CoI** is cognizant of enharmonic equivalents for non-diatonic Indian scales and supports the study of advanced harmonic progressions for Indian music; including transcriptions of Indian musical works for other instruments.
- **CoI** supports the theory of relative modes for Melakarta scales within the realm of existing theory of relative modes of the major scale.
- **CoI** aligns to basic chord structures and is very flexible as it allows composers to choose either Standard Scale degree formulae or Adjusted Scale degree formulae to derive staff notes for various scales.

LEGEND FOR INTERVAL NAMING		
Interval Symbol	**Interval Name**	**Corresponding Scale Degree**
PU	Perfect Unison	1
+1	Augmented Unison	♯1
m2	Minor Second	♭2
°3	Diminished Third	♭♭3
M2	Major Second	2
+2	Augmented Second	♯2
m3	Minor Third	♭3
M3	Major Third	3
P4	Perfect Fourth	4
+4	Augmented Fourth	♯4
°5	Diminished Fifth	♭5
P5	Perfect Fifth	5
+5	Augmented Fifth	♯5
m6	Minor Sixth	♭6
°7	Diminished Seventh	♭♭7
M6	Major Sixth	6
+6	Augmented Sixth	♯6
m7	Minor Seventh	♭7
M7	Major Seventh	7

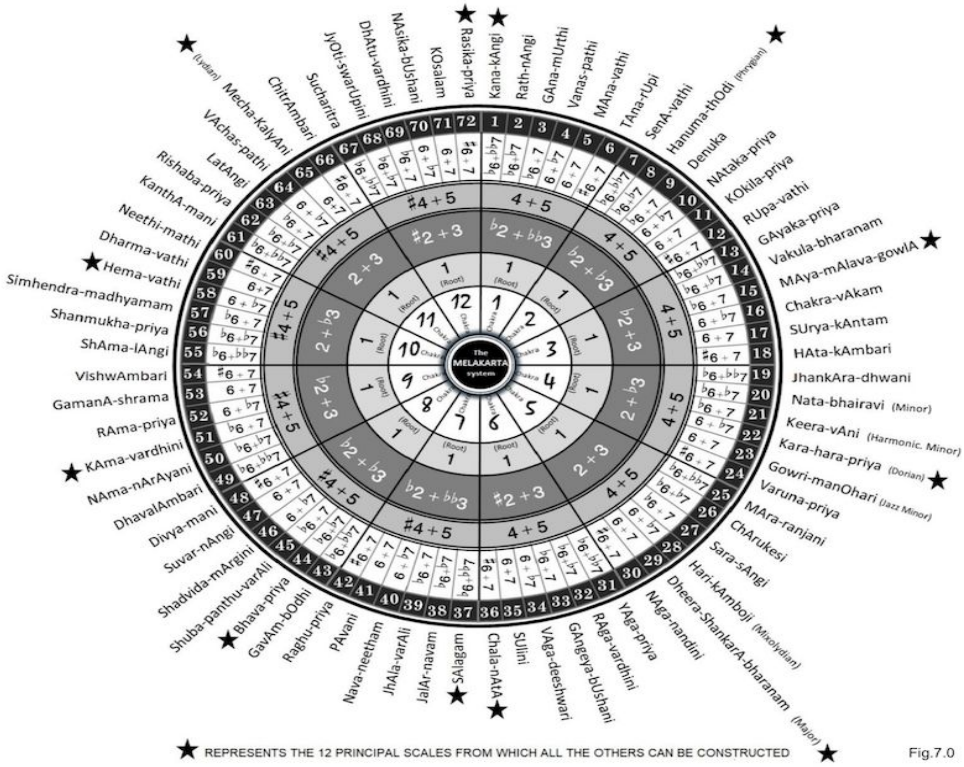
Fig.6

The 72 Melakarta Scales (Standard Scale Degrees)

- The Melakarta System is comprised of 12 sets of scales called Chakras. Each Chakra contains 6 scales, making the total 72 scales. Each scale has a name.
- The scales are arranged in a distinct mathematical sequence making its study structured and visually perceivable.
- Scales #1-36 have a Perfect 4th, Scales #37-72 have an Augmented 4th (Scale #1 and #37 will share all intervals except the 4th).
- The 2nd & 3rd degrees of each scale remain constant for a Chakra (set) and change once every 6 scales in the sequence of ♭2,♭♭3 / ♭2,♭3 / ♭2, 3 / 2,♭3 / 2,3 / ♯2,3.
- The 6th and 7th notes of each scale in a set change in a sequence of ♭6, ♭♭7 / ♭6,♭7 / ♭6, 7 / 6,♭7 / 6,7 / ♯6,7 and the same sequence repeats for each set.

THE MELAKARTA SYSTEM

Follow the scale formula from the inner circle "1 Root", to the outer circle to arrive at the scale number. Apply this scale formula to the **Circle of Intervals** to determine the corresponding notes for the scale in any desired key.



★ REPRESENTS THE 12 PRINCIPAL SCALES FROM WHICH ALL THE OTHERS CAN BE CONSTRUCTED

Fig.7.0

Pronounce Capital A as in "Art" and not "At" Capital O as in "Oath" and not "Of" Capital U as in "Zoo" and not "Us"

1=Unison	♭**2**= min 2nd	**2**=Maj 2nd	♯**2**=Aug 2nd	♭♭**3**=Dim 3rd	♭**3**=min 3rd	**3**=Maj 3rd	**4**=Perfect 4th	♯**4**=Aug 4th
♭**5**=Dim 5th	**5**=Perfect 5th	♯**5**=Aug 5th	♭**6**=min 6th	**6**=Maj 6th	♯**6**=Aug 6th	♭♭**7**=Dim 7th	♭**7**=min 7th	**7**=Maj7

The 72 Melakarta Scales (Adjusted Scale Degrees)

- In the Adjusted Scale degree view, scales with Diminished 3rd, Diminished 7th, Augmented 2nd and Augmented 6th are replaced by their enharmonic equivalent interval to bypass double-flat/double-sharp staff notes, and to align with the scale-chord compatibility principle.
- Enharmonic notes *normalize* the scales into three main interval types - Major, Minor and Perfect; Augmented 4th is excluded as it forms one of the 12 tones.
- Normalized scales are easy to recognize as they form a chromatic sequence of ♭2-2 / ♭6-6 in place of ♭2-♭♭3 / ♭6-♭♭7 and ♭3-3 / ♭7-7 in place of ♯2-3 / ♯6-7.
- This method lays the foundations for developing harmony for these scales, and makes it easier to perceive staff notes and scale-chords in various keys.

THE MELAKARTA SYSTEM

Follow the scale formula from the inner circle '1 Root', to the outer circle to arrive at the scale number. Apply this scale formula to the **Circle of Intervals** to determine the corresponding notes for the scale in any desired key.

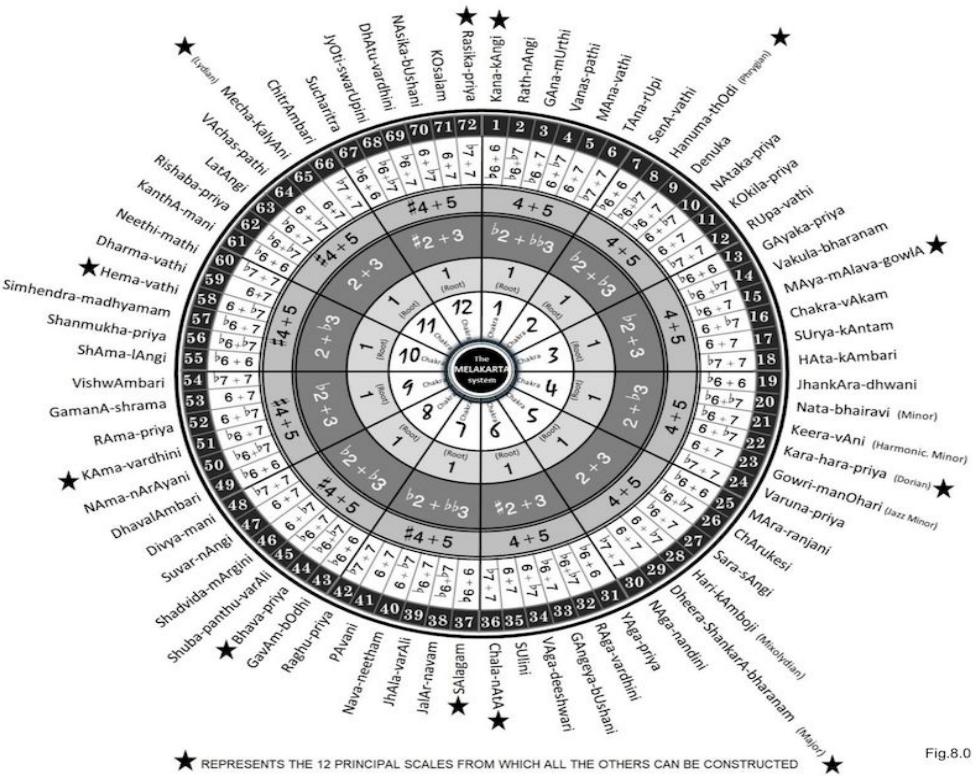


Fig.8.0

Pronounce Capital A as in "Art" and not "At" Capital O as in "Oath" and not "Of" Capital U as in "Zoo" and not "Us"

1=Unison	♭**2**= min 2nd	**2**=Maj 2nd	♯**2**=Aug 2nd	♭♭**3**=Dim 3rd	♭**3**=min 3rd	**3**=Maj 3rd	**4**=Perfect 4th	♯**4**=Aug 4th
♭**5**=Dim 5th	**5**=Perfect 5th	♯**5**=Aug 5th	♭**6**=min 6th	**6**=Maj 6th	♯**6**=Aug 6th	♭♭**7**=Dim 7th	♭**7**=min 7th	**7**=Maj7

Relative Modes of Melakarta Scales

(Scales 1-36)

Since Melakartas are heptatonic, have a 4th and a Perfect 5th, the Western diatonic scales will fall within this set of 72 – namely, the Major scale / (Melakarta #29) and all its relative modes, excluding the Locrian mode. There are other Melakarta scales which form relative modes of each other too.

MELAKARTA (Perfect 4th) / P4	Scale Formula (in Scale Degrees)												RELATIVE MODES (shown as Melakarta scale numbers)					
	PU	m2	M2 / (º3)	m3 / (+2)	M3	P4	+4	P5	m6	M6 / (º7)	m7 / (+6)	M7						
	Unison 1	minor 2nd	Major 2nd (Dim 3rd)	minor 3rd (Aug 2nd)	Major 3rd	Perfect 4th	Aug 4th	Perfect 5th	minor 6th	Major 6th (Dim 7th)	minor 7th (Aug 6th)	Major 7th	2nd mode	3rd mode	4th mode	5th mode	6th mode	7th mode
Chakra 1 - Indhu chakra																		
1 Kana-kAngi	1	♭2	2 / (♭♭3)			4		5	♭6	6 / (♭♭7)			51					
2 Rath-nAngi	1	♭2	2 / (♭♭3)			4		5	♭6		♭7		53		19			
3 GAna-mUrthi	1	♭2	2 / (♭♭3)			4		5	♭6			7	54		55			
4 Vanas-pathi	1	♭2	2 / (♭♭3)			4		5		6	♭7				25			
5 MAna-vathi	1	♭2	2 / (♭♭3)			4		5		6		7			61			
6 TAna-rUpi	1	♭2	2 / (♭♭3)			4		5			♭7 / (♯6)	7						
Chakra 2 - Nethra Chakra																		
7 SenA-vathi	1	♭2		♭3		4		5	♭6	6 / (♭♭7)			63				17	
8 Hanuma-thOdi (**Phrygian)	1	♭2		♭3		4		5	♭6		♭7		65	28	20		29	22
9 DenukA	1	♭2		♭3		4		5	♭6			7	66		56		35	
10 NAtaka-priya	1	♭2		♭3		4		5		6	♭7			64	26			23
11 KOkila-priya	1	♭2		♭3		4		5		6		7			62			
12 RUpa-vathi	1	♭2		♭3		4		5			♭7 / (♯6)	7						
Chakra 3 - Agni Chakra																		
13 GAyaka-priya	1	♭2			3	4		5	♭6	6 / (♭♭7)			69					
14 VakulA-bharanam	1	♭2			3	4		5	♭6		♭7		71		21			58
15 MAya-mAlava-gowlA	1	♭2			3	4		5	♭6			7	72		57			
16 Chakra-vAham	1	♭2			3	4		5		6	♭7				27			59
17 SUrya-kAntam	1	♭2			3	4		5		6		7		7	63			
18 HAta-kAmbari	1	♭2			3	4		5			♭7 / (♯6)	7		43				
Chakra 4 - Veda Chakra																		
19 JhankAra-dhwani	1		2	♭3		4		5	♭6	6 / (♭♭7)						2	53	
20 Nata-bhairavi (**Minor / Aeonian)	1		2	♭3		4		5	♭6		♭7			29	22	8	65	28
21 Keera-vAni (** Harmonic Minor)	1		2	♭3		4		5	♭6			7			58	14	71	
22 Kara-hara-priya (**Dorian)	1		2	♭3		4		5		6	♭7		8	65	28	20		29
23 Gowri-manOhari (**Jazz minor)	1		2	♭3		4		5		6		7	10		64	26		
24 Varuna-priya	1		2	♭3		4		5			♭7 / (♯6)	7				32		
Chakra 5 - Bana Chakra																		
25 MAra-ranjani	1		2		3	4		5	♭6	6 / (♭♭7)						4		
26 ChAru-kesi	1		2		3	4		5	♭6		♭7				23	10		64
27 Sara-sAngi	1		2		3	4		5	♭6			7			59	16		
28 Hari-kAmbOji (**Mixolydian)	1		2		3	4		5		6	♭7		20		29	22	8	65
29 Dheera-ShankarA-bharanam (**Ionian)	1		2		3	4		5		6		7	22	8	65	28	20	
30 NAgA-nandini	1		2		3	4		5			♭7 / (♯6)	7		44		34		
Chakra 6 - Ruthu Chakra																		
31 YAga-priya	1			♭3 / (♯2)	3	4		5	♭6	6 / (♭♭7)								
32 RAga-vardhini	1			♭3 / (♯2)	3	4		5	♭6		♭7				24			
33 GAngeya-bUshani	1			♭3 / (♯2)	3	4		5	♭6			7			60			
34 VAga-dheeshwari	1			♭3 / (♯2)	3	4		5		6	♭7				30		44	
35 SUlini	1			♭3 / (♯2)	3	4		5		6		7		9	66		56	
36 Chala-nAtA	1			♭3 / (♯2)	3	4		5			♭7 / (♯6)	7		45				

Fig.9

Relative Modes of Melakarta Scales

(Scales 37-72)

The second set of scales from #37-72 are separated from #1-36 only by an Augmented 4th. For example, Scale #1 will share the same intervals with Scale #37, **except** the 4th which will be Augmented.

MELAKARTA (Augmented 4th) / +4	Scale Formula (in Scale Degrees)												RELATIVE MODES (shown as Melakarta scale numbers)					
	PU	m2	M2 / (°3)	m3 / (+2)	M3	P4	+4	P5	m6	M6 / (°7)	m7 / (+6)	M7						
	Unison 1	minor 2nd	Major 2nd (Dim 3rd)	minor 3rd (Aug 2nd)	Major 3rd	Perfect 4th	Aug 4th	Perfect 5th	minor 6th	Major 6th (Dim 7th)	minor 7th (Aug 6th)	Major 7th	2nd mode	3rd mode	4th mode	5th mode	6th mode	7th mode
Chakra 7 - Rishi Chakra																		
37 SAlagam	1	♭2	2 / (♭♭3)				♯4	5	♭6	6 / (♭♭7)								
38 JalAr-navam	1	♭2	2 / (♭♭3)				♯4	5	♭6		♭7							
39 JhAla-varAli	1	♭2	2 / (♭♭3)				♯4	5	♭6			7						
40 Nava-neetham	1	♭2	2 / (♭♭3)				♯4	5		6	♭7							
41 PAvani	1	♭2	2 / (♭♭3)				♯4	5		6		7						
42 Raghu-priya	1	♭2	2 / (♭♭3)				♯4	5			♭7 / (♯6)	7						
Chakra 8 - Vasu Chakra																		
43 GavAm-bOdhi	1	♭2		♭3			♯4	5	♭6	6 / (♭♭7)							18	
44 Bhava-priya	1	♭2		♭3			♯4	5	♭6		♭7			34			30	
45 Shubha-panthu-varAli	1	♭2		♭3			♯4	5	♭6			7					36	
46 Shadvida-mArgini	1	♭2		♭3			♯4	5		6	♭7			70				
47 Suvar-nAngi	1	♭2		♭3			♯4	5		6		7						
48 Divya-mani	1	♭2		♭3			♯4	5			♭7 / (♯6)	7						
Chakra 9 - Brahma Chakra																		
49 DhavalAmbari	1	♭2			3		♯4	5	♭6	6 / (♭♭7)								
50 NAma-nArAyani	1	♭2			3		♯4	5	♭6		♭7							
51 KAma-vardhini	1	♭2			3		♯4	5	♭6			7						1
52 RAma-priya	1	♭2			3		♯4	5		6	♭7							
53 GamanA-shrama	1	♭2			3		♯4	5		6		7		19				2
54 VishwAmbari	1	♭2			3		♯4	5			♭7 / (♯6)	7		55				3
Chakra 10 - Disi Chakra																		
55 ShAma-lAngi	1		2	♭3			♯4	5	♭6	6 / (♭♭7)						3	54	
56 Shanmukha-priya	1		2	♭3			♯4	5	♭6		♭7			35		9	66	
57 Simhendra-madhyamam	1		2	♭3			♯4	5	♭6			7				15	72	
58 Hema-vathi	1		2	♭3			♯4	5		6	♭7		14	71		21		
59 Dharma-vathi	1		2	♭3			♯4	5		6		7	16			27		
60 Neeti-mathi	1		2	♭3			♯4	5			♭7 / (♯6)	7				33		
Chakra 11 - Rudra Chakra																		
61 KAnthA-mani	1		2		3		♯4	5	♭6	6 / (♭♭7)						5		
62 Rishabha-priya	1		2		3		♯4	5	♭6		♭7					11		
63 LathAngi	1		2		3		♯4	5	♭6			7				17		7
64 VAchas-pathi	1		2		3		♯4	5		6	♭7		26			23	10	
65 Mecha-kalyAni (**Lydian)	1		2		3		♯4	5		6		7	28	20		29	22	8
66 ChitrAmbari	1		2		3		♯4	5			♭7 / (♯6)	7		56		35		9
Chakra 12 - Aditya Chakra																		
67 Sucharitra	1			♭3 / (♯2)	3		♯4	5	♭6	6 / (♭♭7)								
68 JyOti Swa-rUpini	1			♭3 / (♯2)	3		♯4	5	♭6		♭7							
69 DhAtu-vardini	1			♭3 / (♯2)	3		♯4	5	♭6			7						13
70 NAsikA-bUshani	1			♭3 / (♯2)	3		♯4	5		6	♭7						46	
71 KOsalam	1			♭3 / (♯2)	3		♯4	5		6		7		21			58	14
72 Rasika-priya	1			♭3 / (♯2)	3		♯4	5			♭7 / (♯6)	7		57				15

Fig.10

The Method Behind the Melakarta System

Seventy-two scales might seem daunting at first, but the scales are arranged in such an intuitive mathematical order of permutations in Melakarta theory that they can easily be reconstructed by anyone who perceives the logical aspects of the system. Performance proficiency will take practice, but the essence of the framework is simple.

- The Melakarta System represents the maximum possible combinations of 12 musical intervals denoted by the 12 notes of an octave, if each note/scale degree can be represented only once in a 7-note heptatonic scale with a perfect fifth and one fourth.
- The 72 scales are split in half: 36 scales/ 6 Chakras with a Perfect 4th and 36 scales/ 6 Chakras with an Augmented 4th
- The framework can be streamlined to 1 representative scale from each Chakra; 12 scales in total, of which four are already familiar to the Western ear (#8 Phrygian, #22 Dorian, #29 Ionian/Major, #65 Lydian).

Scale Formula (in Scale Degrees)

MELAKARTA (Perfect 4th) / P4	PU	m2	M2 / (°3)	m3 / (+2)	M3	P4	+4	P5	m6	M6 / (°7)	m7 / (+6)	M7
	Unison 1	minor 2nd	Major 2nd (Dim 3rd)	minor 3rd (Aug 2nd)	Major 3rd	Perfect 4th	Aug 4th	Perfect 5th	minor 6th	Major 6th (Dim 7th)	minor 7th (Aug 6th)	Major 7th
1 Kana-kAngi	1	♭2	2 / (♭♭3)			4		5	♭6	6 / (♭♭7)		
8 Hanuma-thOdi (°Phrygian)	1	♭2		♭3		4		5	♭6		♭7	
15 MAya-mAlava-gowlA	1	♭2			3	4		5	♭6			7
22 Kara-hara-priya (°Dorian)	1		2	♭3		4		5		6	♭7	
29 Dheera-ShankarA-bharanam (°Ionian)	1		2		3	4		5		6		7
36 Chala-nAtA	1			♭3 / (♯2)	3	4		5			♭7 / (♯6)	7

Scale Formula (in Scale Degrees)

MELAKARTA (Augmented 4th) / +4	PU	m2	M2 / (°3)	m3 / (+2)	M3	+4	P5	m6	M6 / (°7)	m7 / (+6)	M7
	Unison 1	minor 2nd	Major 2nd (Dim 3rd)	minor 3rd (Aug 2nd)	Major 3rd	Aug 4th	Perfect 5th	minor 6th	Major 6th (Dim 7th)	minor 7th (Aug 6th)	Major 7th
37 SAlagam	1	♭2	2 / (♭♭3)			♯4	5	♭6	6 / (♭♭7)		
44 Bhava-priya	1	♭2		♭3		♯4	5	♭6		♭7	
51 KAma-vardhini	1	♭2			3	♯4	5	♭6			7
58 Hema-vathi	1		2	♭3		♯4	5		6	♭7	
65 Mecha-kalyAni (°Lydian)	1		2		3	♯4	5		6		7
72 Rasika-priya	1			♭3 / (♯2)	3	♯4	5			♭7 / (♯6)	7

Scale Formula - Key of C

Use **Circle of Intervals** to map Melakarta scales in different keys

	PU	m2	M2 / (°3)	m3 / (+2)	M3	P4	+4	P5	m6	M6 / (°7)	m7 / (+6)	M7
	Unison 1	minor 2nd	Major 2nd (Dim 3rd)	minor 3rd (Aug 2nd)	Major 3rd	Perfect 4th	Aug 4th	Perfect 5th	minor 6th	Major 6th (Dim 7th)	minor 7th (Aug 6th)	Major 7th
1 Kana-kAngi	C	D♭	D/ (E♭♭)			F		G	A♭	A/ (B♭♭)		
8 Hanuma-thOdi (°Phrygian)	C	D♭		E♭		F		G	A♭		B♭	
15 MAya-mAlava-gowlA	C	D♭			E	F		G	A♭			B
22 Kara-hara-priya (°Dorian)	C		D	E♭		F		G		A	B♭	
29 Dheera-Shankara-bharanam (°Ionian)	C		D		E	F		G		A		B
36 Chala-nAtA	C			E♭ /(D♯)	E	F		G			B♭ /(A♯)	B

Scale Formula - Key of C

Use **Circle of Intervals** to map Melakarta scales in different keys

	PU	m2	M2 / (°3)	m3 / (+2)	M3	+4	P5	m6	M6 / (°7)	m7 / (+6)	M7
	Unison 1	minor 2nd	Major 2nd (Dim 3rd)	minor 3rd (Aug 2nd)	Major 3rd	Aug 4th	Perfect 5th	minor 6th	Major 6th (Dim 7th)	minor 7th (Aug 6th)	Major 7th
37 SAlagam	C	D♭	D/ (E♭♭)			F♯	G	A♭	A/ (B♭♭)		
44 Bhava-priya	C	D♭		E♭		F♯	G	A♭		B♭	
51 KAma-vardhini	C	D♭			E	F♯	G	A♭			B
58 Hema-vathi	C		D	E♭		F♯	G		A	B♭	
65 Mecha-kalyAni (°Lydian)	C		D		E	F♯	G		A		B
72 Rasika-priya	C			E♭ /(D♯)	E	F♯	G			B♭ /(A♯)	B

Fig.11

- The six scales to the left are made up of 2 identical tetrachords. E.g. (1,2,3,4 & 5,6,7,8) or (1,♭2, 3,4 & 5,♭6, 7, 8)
- The six scales to the right are the Augmented 4th counterparts of the scales to the left.
- By varying combinations of the 2nd, 3rd, 6th and 7th intervals, the remaining 60 scales can be derived.
- The 72 scales are grouped into 12 sets (called Chakras); each containing 6 scales.
  - The 2nd & 3rd degrees remain constant for a Chakra and change only once every 6 scales (once a set) in the order of

    ♭2 + ♭♭3 (Set1) ♭2 + ♭3 (Set2) ♭2 + 3 (Set3) 2 + ♭3 (Set4) 2 + 3 (Set5) ♯2 + 3 (Set6)

    ♭2 + ♭♭3 (Set7) ♭2 + ♭3 (Set8) ♭2 + 3 (Set9) 2 + ♭3 (Set10) 2 + 3 (Set11) ♯2 + 3 (Set12)

  - The 6th and 7th degrees change for every scale in a sequence , which repeats for each chakra. The sequence is

    ♭6 + ♭♭7 (1st scale in any set will always be this interval)
    ♭6 + ♭7 (2nd scale in any set will always be this interval)
    ♭6 + 7 (3rd scale in any set will always be this interval)
    6 + ♭7 (4th scale in any set will always be this interval)
    6 + 7 (5th scale in any set will always be this interval)
    ♯6 + 7 (6th scale in any set will always be this interval)
- Modes of the Major scale need to be remembered as **parallel modes** and **not relative modes** *(e.g., C Major, C Dorian, C Lydian etc.)*

The Method Behind the Melakarta System

In India, students of classical music are taught to remember various scale names based on the scale's '**krama**' (ascent-descent progression from the tonic), and then to identify them by ear. Students recognize these scales by reference to compositions or by mapping the intervals they hear and building the scale from the ground up.

In South Indian classical training, the Melakarta scales are taught to children by rote memory, typically one Chakra per week. It has been observed that many students actually manage to remember all the 72 scale names in sequence in under 12 weeks! They build them logically by referencing to the "one representative scale" from each Chakra. Aural recognition of a multitude of scales is reinforced through musical compositions in different scales.

So, how do Indian musicians develop the skill of being able to identify hundreds of scales by ear and improvise instantly?

The key to this lies in the initial training where high emphasis is given to the **tonal center** versus **modal center** so that scale-recognition abilities can be cultivated. The tonal center is fundamental to discovering the emotional verse of any scale. It is this reference to the tonic which makes the major scale in C sound lively, its relative mode in A (Aeolian /Minor) sound poignant, or its relative mode in E (Phrygian) sound Middle Eastern. The shifting of the tonal center from C to A, or C tor E temporarily creates a different emotional perception in the mind of the listener.

Modal music is not alien to India. The concept of modal differentiation is called "***Shruti-bheda***" or **microtonal-differentiation,** which stems from shifting the tonal center within the original scale. This technique is commonly used in South Indian classical performances, but not applied extensively since frequent modal shifts are believed to interrupt and disturb the emotional equilibrium established by the original scale in the listener's mind.

To summarize this section,

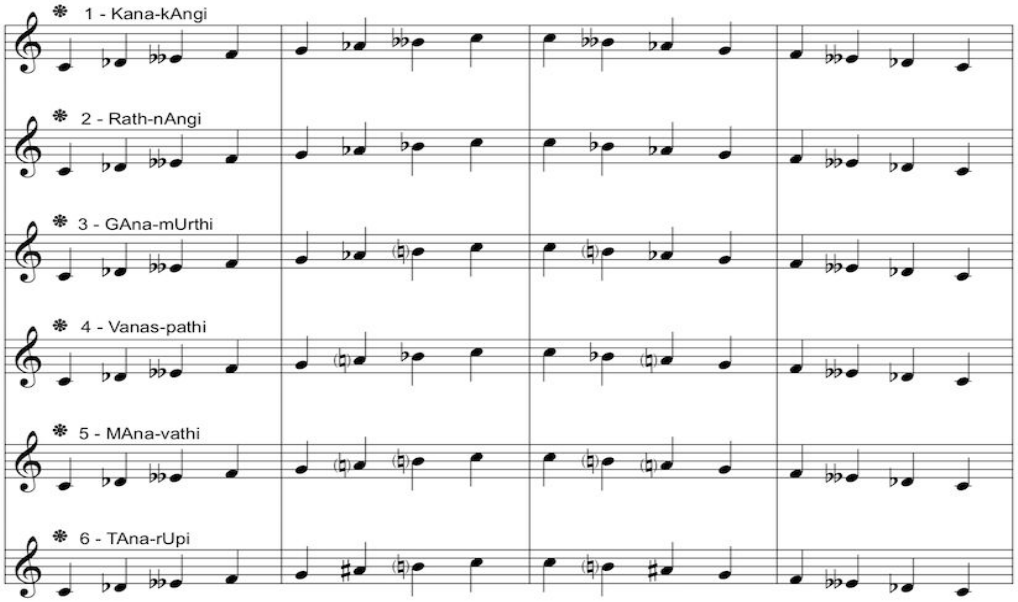
- **Melakarta scales open up a myriad of new possibilities for composers and composition teachers.**
- **The etudes in this book can be mastered by advanced performers in 3-4 months and by intermediate students in 12-15 months. The first two or three etudes may challenge one's ability to stay within the scale boundary, but by the time one is in the fourth or fifth etude, adapting to this style of composition becomes noticeably easier.**
- **As mentioned before, scale-boundary is not an unfamiliar concept to the West. There are countless classical pieces written entirely in the major or minor scale. In India, the scale-boundary rule is applied to hundreds of scales. Therefore, with consistent practice, any Western player can develop mastery and finesse with these etudes and expand their musical awareness.**

The 72 Melakarta Scales in C

Non-diatonic scales which may require enharmonic replacement for Scale-Chord compatibility, are marked with an asterisk (*).

Augmented 2nd (+2/♯2) and Augmented 6th (+6/♯6) may need to be replaced with enharmonic equivalent intervals ♭3 and ♭7.
Diminished 3rd (°3 /♭♭3) and Diminished 7th (°7/ ♭♭7) may need to be replaced with enharmonic equivalent intervals ♯2 and ♯6.

Chakra 1 : INDHU CHAKRA
(Perfect 4th)



SYMBOLIC MEANING OF INDHU CHAKRA
Indhu means "The Moon". In metaphysics, the moon is associated with the mind. The mind is a formless continuum; a complex aggregation of cognitive faculties that enables awarenesss, thinking, reasoning, and judgement. The mind is like a lens to one's perception of the world; it dictates every aspect of one's personality based on how it is conditioned. **Indhu Chakra** symbolizes that every seeker on the path will need to eventually gain mastery over the mind.

MUSICAL MOTIF
Motivic development around the first tetrachord (1- ♭2- 2- 4) with emphasis on the ♭2-2-4 / 4-2-♭2 and different intervals of dyads and arpeggiated progressions will help establish the distinctive quality of the scales in this chakra.
Examples of melodic motifs: 1-♭2-2-♭2-1 / ♭2-2-4-2-♭2 / 2-4-5-4-2 / ♭2-2-4-5 / 8-6-9-♭9 / 7-6-5-4-2-♭2 / 2-4-♭6-5-4-2-♭2-1

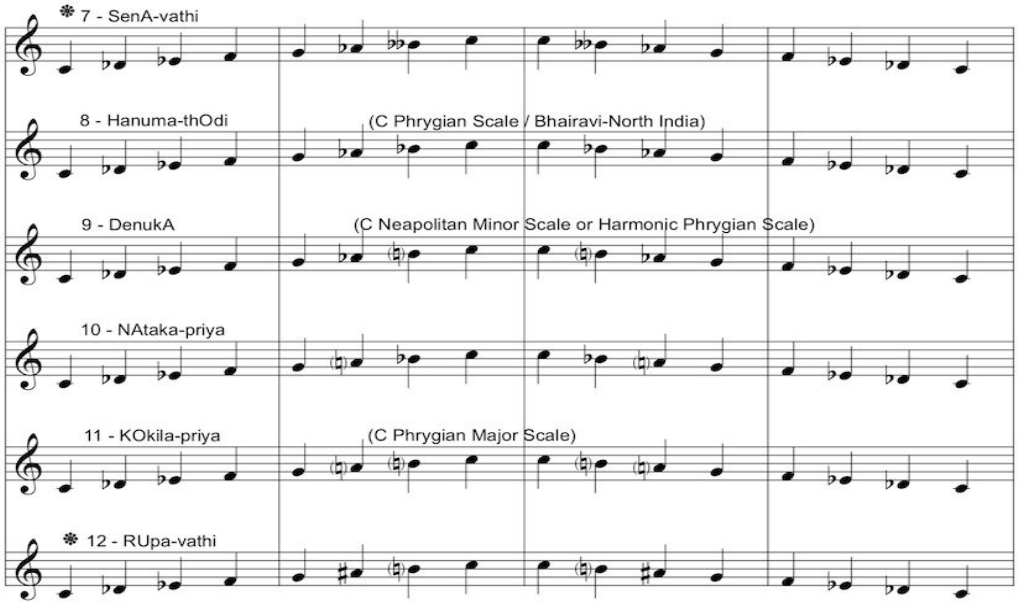
EXAMPLE - Etude in Melakarta #1 - Kana-kAngi TRACK 1: p. 42 Piano TRACK 13: p. 74 Guitar

The 72 Melakarta Scales in C

Non-diatonic scales which may require enharmonic replacement for Scale-Chord compatibility, are marked with an asterisk (*).

Augmented 2nd (+2/♯2) and Augmented 6th (+6/♯6) may need to be replaced with enharmonic equivalent intervals ♭3 and ♭7.
Diminished 3rd (°3 /♭♭3) and Diminished 7th (°7/ ♭♭7) may need to be replaced with enharmonic equivalent intervals ♯2 and ♯6.

Chakra 2 : NETHRA CHAKRA
(Perfect 4th)



SYMBOLIC MEANING OF NETHRA CHAKRA
Nethra means "Eyes". Metaphysically, it implies *keen vision* and the aptitude to look within for answers. *Sight* is what we see with our eyes; *vision* is what we see with our mind. Vision helps the seeker develop passion.
Nethra Chakra implies that seekers with a vision will never feel compelled into pursuing knowledge; their vision will pull them towards their goals instead.

MUSICAL MOTIF
Motivic development around the first tetrachord (1 ♭2 ♭3 4) with emphasis on ♭2-♭3- 4- 5-♭3- 1- ♭2 will help establish the distinctive quality of the scales in this chakra. All the scales in this chakra will have an Eastern feel (e.g. Phrygian).
Examples of melodic motifs: 1-♭3-5-♭7-♭6 / ♭2- 4-♭6-♭7-5 / 5-♭3-1-6- 4 / ♭2-♭6-♭7-♭6-5 / ♭2-4-5-♭3 / 4-5-♭3-1-♭2 / ♭6-♭2-♭3-1 / 7-♭7-5-♭6-♭7-♭6 / 4-5-♭3-4-♭2-♭3-1

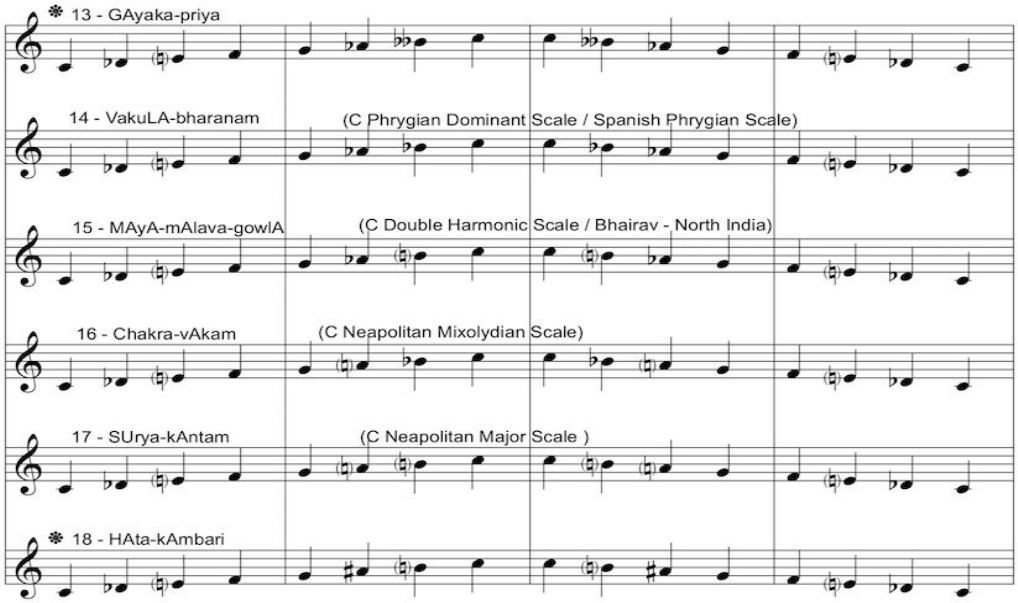
EXAMPLE - Etude in Melakarta #10 - NAtaka-priya TRACK 2: p. 45 Piano TRACK 14: p. 77 Guitar Duet

The 72 Melakarta Scales in C

Non-diatonic scales which may require enharmonic replacement for Scale-Chord compatibility, are marked with an asterisk (*).

Augmented 2nd (+2/♯2) and Augmented 6th (+6/♯6) may need to be replaced with enharmonic equivalent intervals ♭3 and ♭7.
Diminished 3rd (°3 /♭♭3) and Diminished 7th (°7/ ♭♭7) may need to be replaced with enharmonic equivalent intervals ♯2 and ♯6.

Chakra 3 : AGNI CHAKRA
(Perfect 4th)



SYMBOLIC MEANING OF AGNI CHAKRA
Agni means "Fire". Fire represents one's passions, compulsions, the desire to possess, and the relentless pursuit of the object of desire. Passion is energy. It will help the seeker move beyond obstacles and limitations.
Agni Chakra symbolically alludes that a seeker who has undying passion and fiery persistence to acquire knowledge will never cease to grow, since his inspiration and motivation are constanty fueled from within.

MUSICAL MOTIF
The foundational studies for South Indian classical music are based on Scale #15. This scale is believed to calm the mind, attune it to music, and foster a liking for music. The ♭2/3 interval accounts for the emotional verve of these scales.
Examples of melodic motifs: 1-3-5-♭7-♭9-8 / ♭2-3-4-♭6-5 / 4-5-3-1-♭2 / ♭6-1-3-5-♭7-6-♭6 / 1-4-6-♭9-8-♭7-6 / 1-3-♭7-♭6 / 1-3-♭6-5 -4-3-1-♭2-3-1 / 1-3-♭6-7-8-5-4-3 / 4-♭6-♭2-3-5 -1 / ♭7-6-3-4-5-3-1-♭2-♭7-♭2-1

EXAMPLE - Etude in Melakarta #16 - Chakra-vAkam TRACK 3: p. 48 Piano TRACK 15: p. 80 Guitar

The 72 Melakarta Scales in C

Non-diatonic scales which may require enharmonic replacement for Scale-Chord compatibility, are marked with an asterisk (*).

Augmented 2nd (+2/♯2) and Augmented 6th (+6/♯6) may need to be replaced with enharmonic equivalent intervals ♭3 and ♭7.
Diminished 3rd (°3 /♭♭3) and Diminished 7th (°7/ ♭♭7) may need to be replaced with enharmonic equivalent intervals ♯2 and ♯6.

Chakra 4 : VEDA CHAKRA
(Perfect 4th)

SYMBOLIC MEANING OF VEDA CHAKRA
Veda means "Body of Knowledge". The Vedas are among the oldest sacred texts of India and are said to contain hymns which hold secrets about the origin of the universe, the source of sound, the science of music, metaphysics, quantum physics, cosmology, natural and medicinal sciences, and more. The Vedas were written by sages who were bestowed with this knowledge during deep meditation. The study of the Vedas is a criterion for those on the spiritual path and is taught in Vedantic schools in India.
Veda Chakra implies that a seeker who has vision and passion will be bestowed with boundless wisdom in the field of knowledge being pursued, similar to the sages who realized secrets of the universe through meditation.

MUSICAL MOTIF
Four scales from this chakra are very familiar to the Western ear - #20, #21, #22, #23, we won't elaborate much on the motivic development for this chakra. The etude in Melakarta Scale #19 provides a good example of how scale-boundary based compositions can be developed even in the absence of the natural 7th interval.

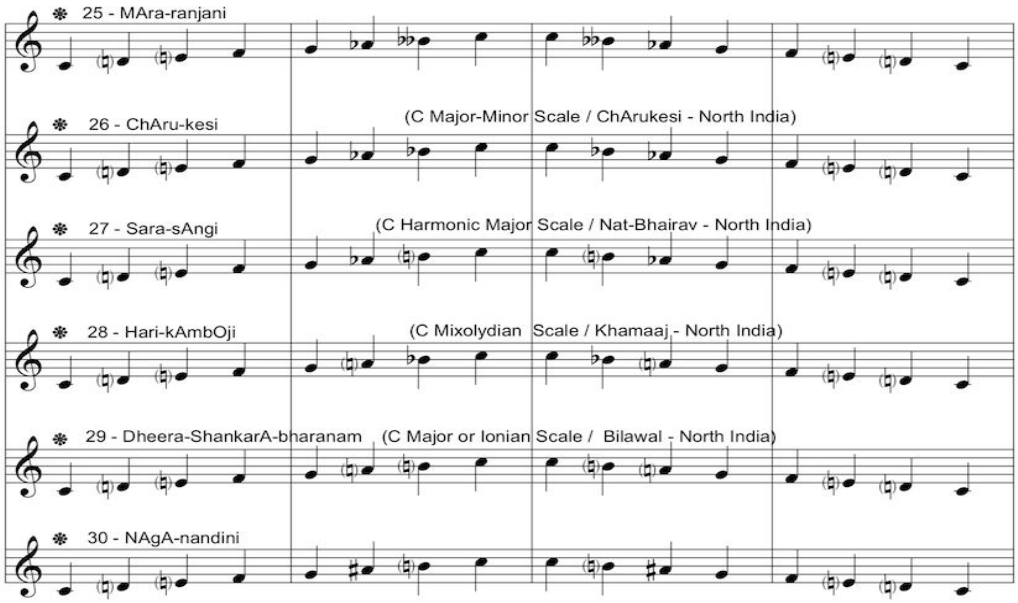
EXAMPLE - Etude in Melakarta #19 - Jhan-kAra-dhwani TRACK 4: p.50 Piano TRACK 16: p. 82 Guitar

The 72 Melakarta Scales in C

Non-diatonic scales which may require enharmonic replacement for Scale-Chord compatibility, are marked with an asterisk (*).

Augmented 2nd (+2/♯2) and Augmented 6th (+6/♯6) may need to be replaced with enharmonic equivalent intervals ♭3 and ♭7.
Diminished 3rd (°3 /♭♭3) and Diminished 7th (°7/ ♭♭7) may need to be replaced with enharmonic equivalent intervals ♯2 and ♯6.

Chakra 5 : BANA CHAKRA
(Perfect 4th)



SYMBOLIC MEANING OF BANA CHAKRA
Bana means "Arrow" - synonymous with arrow-like precision and focus. To absorb, process and assimilate vast amounts of knowledge (e.g. music), the mind needs both determination and right concentration. The five main obstacles to unwavering focus are laziness, forgetfulness, mental wandering, feelings of despondency and failure to correct any of these problems when they arise.
Bana Chakra symbolizes that to reach a desired goal, the seeker must pursue knowledge with unswerving focus and precision of a steadfast mind.

MUSICAL MOTIF
There are two scales from this chakra which don't need introduction: #28 (Mixolydian scale) and #29 (Ionian/Major scale). We won't elaborate much on the motivic development for these scales.
Scale #26 and #27 in particular have an intrinsic softness to them because of the ♭6 in the second tetrachord.
Example of melodic motifs: 1-3-4-♭6-♭7-8-♭7-♭6-4-5-3 / 1-4-♭6-7-8-9-7-♭6-4-5-3-2-3-♭6-5 / 1-3-4-3-8-7-♭7- 4-♭7- 5-2-3 / 3-5-8-10-11-9-♭7-7-8 / 3-8-♭7- 5-3-4-2-♭7-♭6-5-3

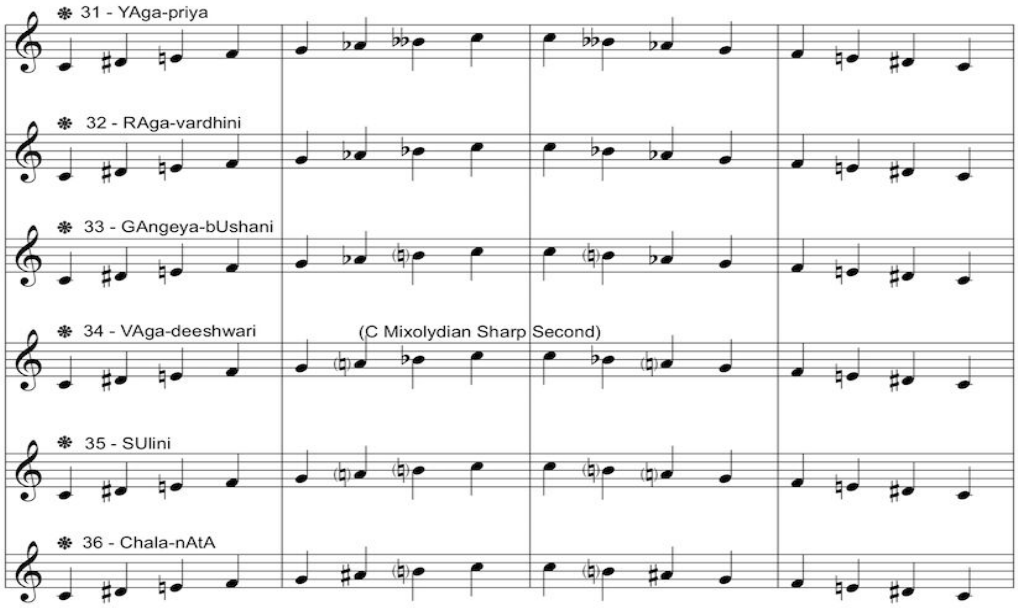
EXAMPLE - Etude in Melakarta #27 - Sara-sAngi TRACK 5: p. 52 Piano TRACK 17: p. 84 Guitar

The 72 Melakarta Scales in C

Non-diatonic scales which may require enharmonic replacement for Scale-Chord compatibility, are marked with an asterisk (*).

Augmented 2nd (+2/♯2) and Augmented 6th (+6/♯6) may need to be replaced with enharmonic equivalent intervals ♭3 and ♭7.
Diminished 3rd (°3 /♭♭3) and Diminished 7th (°7/ ♭♭7) may need to be replaced with enharmonic equivalent intervals ♯2 and ♯6.

Chakra 6 : RUTHU CHAKRA
(Perfect 4th)



SYMBOLIC MEANING OF RUTHU CHAKRA
Ruthu means "Seasons". In metaphysics, it implies seasonal, ephemeral and cyclical. When the seeker's mind strives to develop focus, there will be opposing forces at work which will create resistance and distractions, seasonally and cyclically. But these forces never last; they come and go.
Ruthu Chakra symbolizes that contrasting forces co-exist in nature and are inherently cyclical, but transient. Once the mind understands this and learns to ride the wave, the seeker will be able to develop long-term and sustained focus, and will not succumb to ephemeral events.

MUSICAL MOTIF
Scales in this chakra will have a minor pentatonic feel to them because of the absence of the natural 2nd interval and the notes 1-♭3(=♯2)-4-5 which make up four notes of the minor pentatonic scale. Motivic development along the chromatic passage of ♯2- 3- 4 / ♯6-7-8 helps access the emotional energy of the scales.
Examples of melodic motifs: 1-3-5-4-♭7-5 / ♯2-3-5-4-3-8-7-♯6 / 1-3-4-♯2-3-5-8-7 / 5-♭7-6-3-5-4-3-♯2 / ♭7-3-5-7-8-♭7-6 / ♭7-6-5-4-3-♯2 / 3-4-5-3-4-3-♯2-1

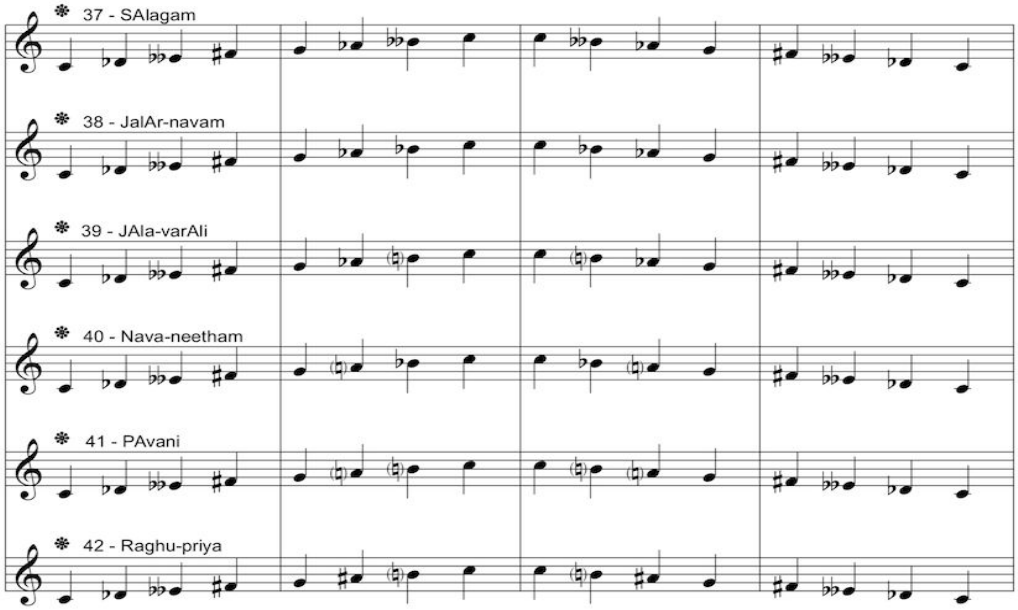
EXAMPLE - Etude in Melakarta #36 - Chala-nAtA TRACK 6: p. 54 Piano TRACK 18: p. 86 Guitar

The 72 Melakarta Scales in C

Non-diatonic scales which may require enharmonic replacement for Scale-Chord compatibility, are marked with an asterisk (*).

Augmented 2nd (+2/♯2) and Augmented 6th (+6/♯6) may need to be replaced with enharmonic equivalent intervals ♭3 and ♭7.
Diminished 3rd (°3 /♭♭3) and Diminished 7th (°7/ ♭♭7) may need to be replaced with enharmonic equivalent intervals ♯2 and ♯6.

Chakra 7 : RISHI CHAKRA
(Augmented 4th)



SYMBOLIC MEANING OF RISHI CHAKRA
Rishi implies a "Sage". In India, *Rishi* refers to one who has reached a high degree of spiritual awakening, and has discovered Truth not by reasoning or logic, but through mind-control, experience and revelation.
Rishi Chakra symbolizes that a seeker who has trained his mind to be still, develops sage-like qualities and becomes receptive to incalculable creative, cognitive and scholaristic abilities in various fields.

MUSICAL MOTIF
Chakra 7 is the Augmented 4th counterpart of Chakra 1. Revisit the motifs in Chakra 1.
The Augmented 4th along with the 1-♭2-2 chromatic sequence will tend to create perceptible tension in the music, especially in slow melodic sequences. Less linear/non-chromatic phrasing, frequent resolution into the Tonic or Perfect 5th, and the use of Perfect 4th or Perfect 5th dyads will help with the melodic movement for these six scales.
Examples of melodic motifs: 1-2(♭♭3)-♯4-5-6 / 2(♭♭3)-5-♯4-5-♭6-♯4 / 5-♯4-2(♭♭3)-♭2 / 6-♭6-5-♯4-♭9-8-6 / ♭9-8-7-6-5-♯4 / 2(♭♭3)-♯4-5-2(♭♭3)-♯4-1-2(♭♭3)-6-♭2-1

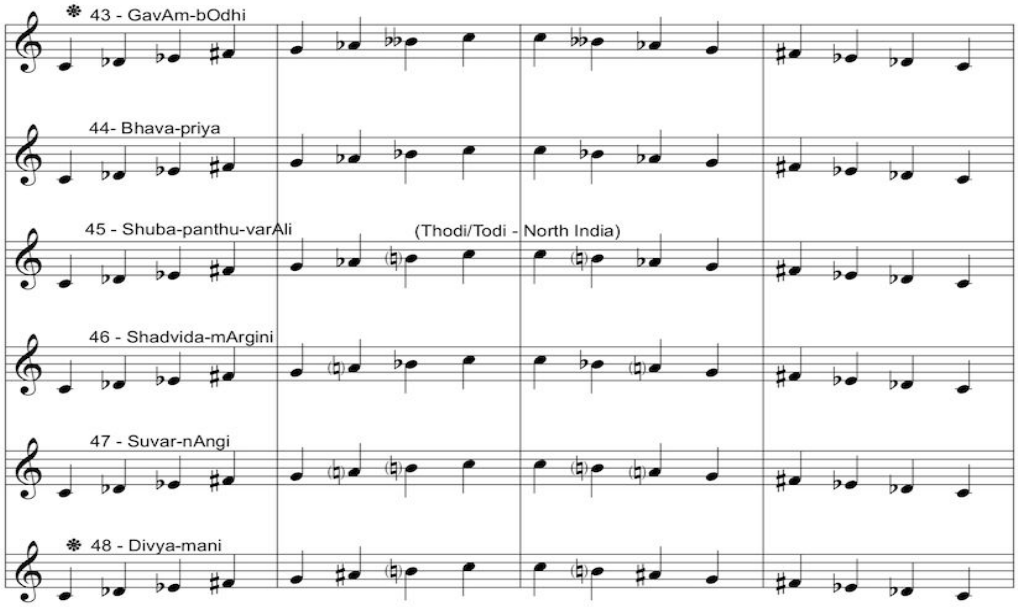
EXAMPLE - Etude in Melakarta #37 - SAlagam TRACK 7: p. 57 Piano TRACK 19: p. 88 Guitar

The 72 Melakarta Scales in C

Non-diatonic scales which may require enharmonic replacement for Scale-Chord compatibility, are marked with an asterisk (*).

Augmented 2nd (+2/♯2) and Augmented 6th (+6/♯6) may need to be replaced with enharmonic equivalent intervals ♭3 and ♭7.
Diminished 3rd (°3 /♭♭3) and Diminished 7th (°7/ ♭♭7) may need to be replaced with enharmonic equivalent intervals ♯2 and ♯6.

Chakra 8 : VASU CHAKRA
(Augmented 4th)



SYMBOLIC MEANING OF VASU CHAKRA
Vasu means "Aspects of Nature", referring to logic-defying facets of nature that cannot be understood by the mind. The mind can usually proceed only so far based upon what it knows through reasoning; but there comes a point in the path of a seeker where the mind opens up to a higher plane of knowledge, but can never prove how it got there.
Vasu Chakra symbolizes that a seeker who is determined on his path will be bestowed with knowledge in inexplicable ways by nature's unseen and enigmatic forces.

MUSICAL MOTIF
Chakra 8 is the Augmented 4th counterpart of Chakra 2. Revisit the motifs in Chakra 2.
The Augmented 4th along with the 1-♭2-♭3 will create a somber feeling in the music, especially if the melodic phrasing is too linear (e.g., 1-♭2-♭3-♯4). The use of arpeggios and diminished chords can help with building interesting voice leadings for these scales.
Examples of melodic motifs: 1-♭3-♯4-♭6-7 / ♭2-♯4-♭6-♯4-♭9-1 / ♭3-♭6-♭10-♭9-7-8 / ♭2-♯4-♭6-♯4-♭2 / ♭3-♭6-8-♭6-♭3 / ♯4-7-♭10-7-♯4 / 1-♭3-♯4-6-8-7-6-♯4-♭3 / ♭9-7-6-♯4-6-8

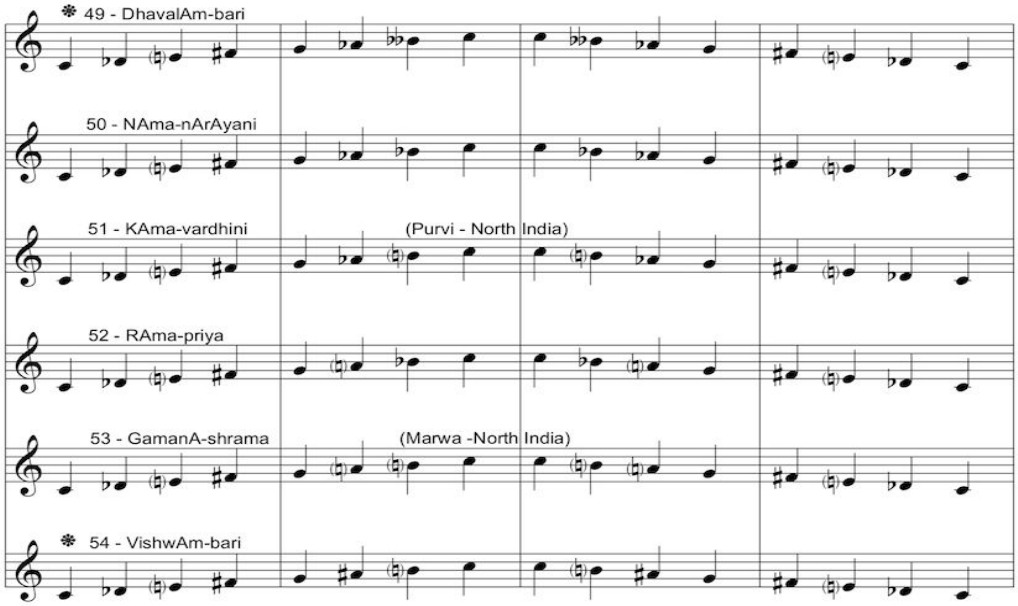
EXAMPLE - Etude in Melakarta #45 - Shuba-panthu-varAli TRACK 8: p. 60 Piano TRACK 20: p. 90 Guitar

The 72 Melakarta Scales in C

Non-diatonic scales which may require enharmonic replacement for Scale-Chord compatibility, are marked with an asterisk (*).

Augmented 2nd (+2/♯2) and Augmented 6th (+6/♯6) may need to be replaced with enharmonic equivalent intervals ♭3 and ♭7.
Diminished 3rd (°3 /♭♭3) and Diminished 7th (°7/ ♭♭7) may need to be replaced with enharmonic equivalent intervals ♯2 and ♯6.

Chakra 9 : BRAHMA CHAKRA
(Augmented 4th)



SYMBOLIC MEANING OF BRAHMA CHAKRA
Brahma means "The Creator" - referring to the single Creative Force behind all the diversity that exists in the Universe. As one disciplines the mind through music or any knowledge form, the power and nature of this Force becomes more apparent to the mind, leading the seeker into a state of surrender. By inference to one's own experience, one can then deduce that the same energy is omnipresent in all. This realization fosters a deep sense of oneness.
Brahma Chakra implies that in a developed state of mind, the seeker experiences subtler aspects of life, becomes increasingly cognizant of a greater Force at work, and learns to start seeing everyone with an equal eye.

MUSICAL MOTIF
Chakra 9 is the Augmented 4th counterpart of Chakra 3. Revisit the motifs in Chakra 3.
The ♭2/3 and 3/♯4/♭6 notes can inspire some of the the most novel sounding melodies.
Examples of melodic motifs: ♯4-♭6-8-♭9-7-♭6-♯4-3 / ♭6-♯4-5-3-♭9-8-10-♭9-7 / 1-♭2-3-♯4-6-7-♭9-8 / ♯4-3-8-7-6-♯4- ♭2-3 / 1-♭2-3-♭7-6-5-♯4 / 3-♭9-8-♭7-6 -5-6-♯4 / 5-6-♭7-10-♭9-8

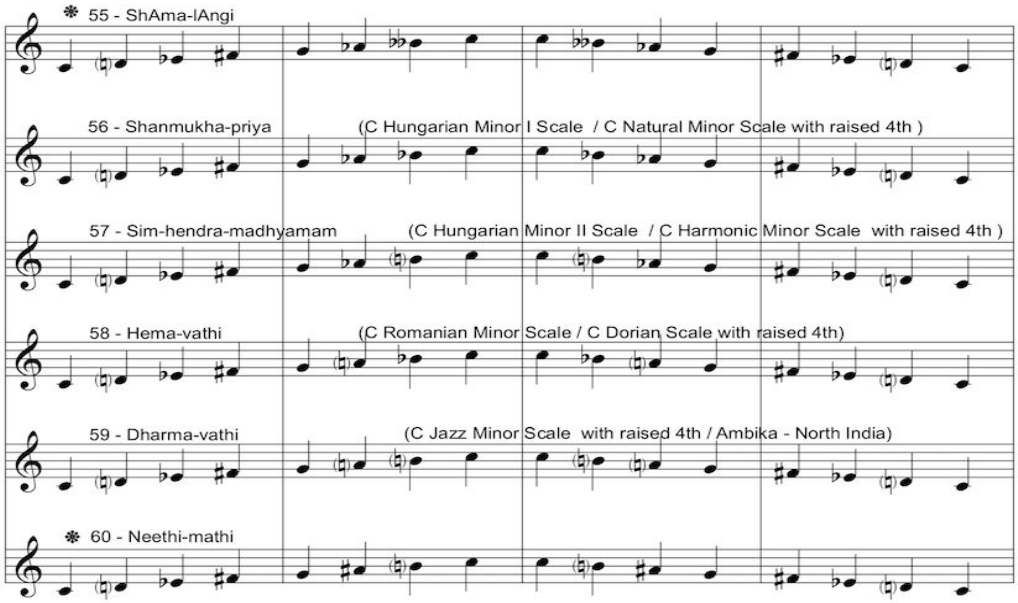
EXAMPLE - Etude in Melakarta #51 - KAma-vardhini TRACK 9: p. 63 Piano TRACK 21: p. 92 Guitar

The 72 Melakarta Scales in C

Non-diatonic scales which may require enharmonic replacement for Scale-Chord compatibility, are marked with an asterisk (*).

Augmented 2nd (+2/♯2) and Augmented 6th (+6/♯6) may need to be replaced with enharmonic equivalent intervals ♭3 and ♭7.
Diminished 3rd (°3 /♭♭3) and Diminished 7th (°7/ ♭♭7) may need to be replaced with enharmonic equivalent intervals ♯2 and ♯6.

Chakra 10 : DISI CHAKRA
(Augmented 4th)



SYMBOLIC MEANING OF DISI CHAKRA
Disi means "Direction". Metaphysically, it implies *space and time* within which the human mind is encapsulated and constructs its impression of reality. Through intense involvement in a profound activity (e.g. music, meditation), the seeker can experience timelessness which leads to dissolution of spatial identity in the mind. Musicians have long referred to being so 'lost in music', that their mind temporarily loses sense of space and time. This experience is however sporadic and impermanent; therefore, the mind can never fathom the possibility of a reality devoid of space-time relativity. **Disi Chakra** symbolizes that the seeker's perception of physical space and time needs to dissolve, so that the mind can then re-establish itself in a newer, Higher reality, on its path to spiritual enlightenment.

MUSICAL MOTIF
Chakra 10 is the Augmented 4th counterpart of Chakra 4. Revisit the motifs in Chakra 4. There are 4 scales here that should be familiar to the Western ear - the only difference being that P4 is replaced by +4
Scale 56 = Natural Minor Scale with ♯4, Scale 57 = Harmonic Minor Scale with ♯4, Scale 58 = Dorian Scale with ♯4 and Scale 59= Jazz Minor Scale with ♯4.
Examples of melodic motifs: 1-♯4-5-8-♭10-9-7-5-6-♯4 / ♭3-♭7-6-5-♯4-5-♭3 / 5-♭3-1-♭3-5-♯4-2 / 8-♭7-6-♯4-5-♭3/ 1-♭3-♭6-8-♭10-9-8-7 / 9-5-♭6-♯4-5-2-♭3-1-♭7-♭6 / ♭7-9-♭10-9-♭7-♭6-5-♯4-♭3-1-2

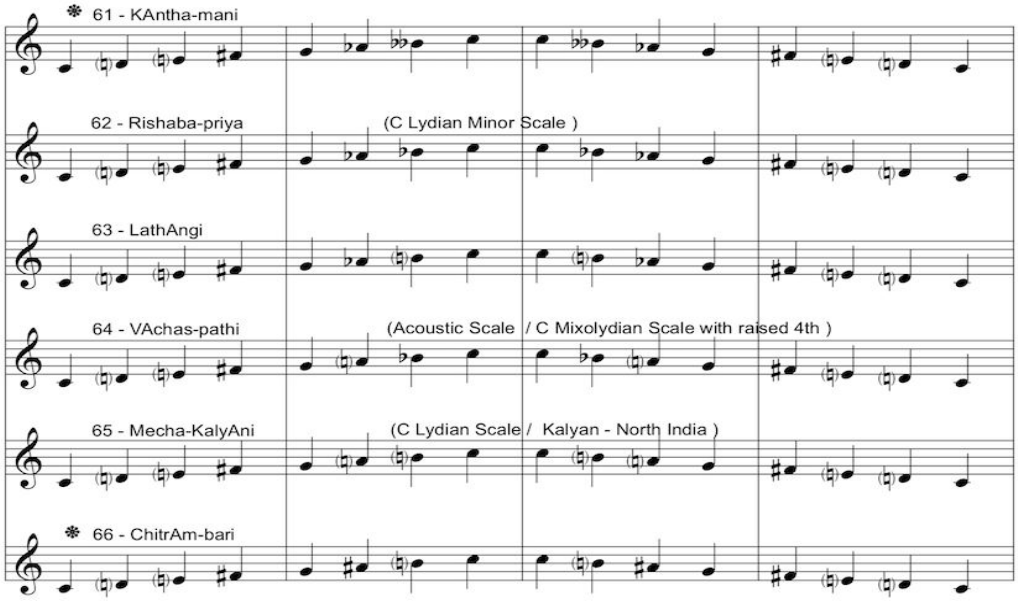
EXAMPLE - Etude in Melakarta #59 - Dharma-vathi TRACK 10: p. 66 Piano TRACK 22: p. 94 Guitar

The 72 Melakarta Scales in C

Non-diatonic scales which may require enharmonic replacement for Scale-Chord compatibility, are marked with an asterisk (*).

Augmented 2nd (+2/♯2) and Augmented 6th (+6/♯6) may need to be replaced with enharmonic equivalent intervals ♭3 and ♭7.
Diminished 3rd (°3 /♭♭3) and Diminished 7th (°7/ ♭♭7) may need to be replaced with enharmonic equivalent intervals ♯2 and ♯6.

Chakra 11 : RUDRA CHAKRA
(Augmented 4th)



SYMBOLIC MEANING OF RUDRA CHAKRA
Rudra means "Destroyer of Ignorance". In metaphysics, this means that the seeker's mind has been freed from conditioning and delusion. It wakes up to a new experience of reality in which its prior perceptions of the world now seem illusory. Beholding this Truth more tenaciously than before, the mind begins to perceive the world in a whole new light. **Rudra Chakra** symbolizes that through the power of the seeker's intensity and quest for knowledge, the mind's veil of delusion can be permanently lifted. The moment of this realization marks the end of ignorance.

MUSICAL MOTIF
Chakra 11 is the Augmented 4th counterpart of Chakra 5. Melakarta #65 Lydian (Major scale with #4) and the Acoustic scale (Mixolydian Scale with #4) should be familiar to the Western ear. Lydian is used more as a mode in the West than a scale in itself. In India, the Lydian scale expresses ultimate humility, surrendering of the ego and creates an ecstatic melody like none other when every note is in perfect intonation. Try improvising with the Lydian scale after sunset into the night.
Examples of melodic motifs: 1-♯4-3-5-♯4-7-6-♯4-2-3 / 1-3-8-6-♯4-2-7-5-3 / 3-♭6-3-2-1-7-6-♭6 / 8-♭6-♯4-2-3-♭6-5 / 7-2-3-♯4-♭6-7-9-10-9-8 / 8-♯4-5-3-1-2 / 3-♭7-6-5-♯4 / 5-8-♭7-6 / 3-8-♭7-5-♯4 / ♯4-5-3-2-7-1

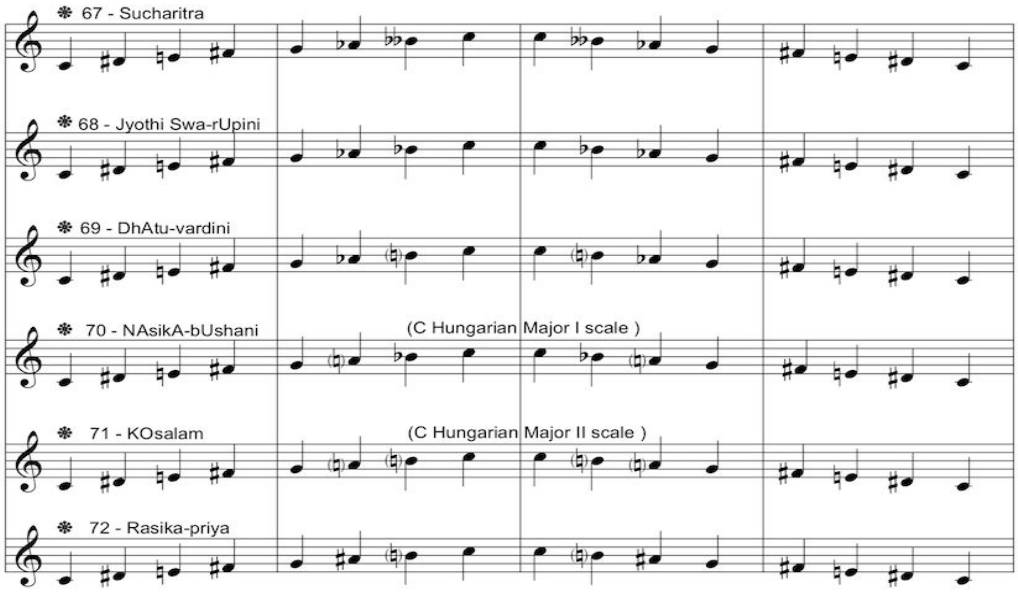
EXAMPLE - Etude in Melakarta #65 - Mecha-kalyAni (Lydian) TRACK 11: p. 68 Piano TRACK 23: p.96 Guitar

The 72 Melakarta Scales in C

Non-diatonic scales which may require enharmonic replacement for Scale-Chord compatibility, are marked with an asterisk (*).

Augmented 2nd (+2/♯2) and Augmented 6th (+6/♯6) may need to be replaced with enharmonic equivalent intervals ♭3 and ♭7.
Diminished 3rd (°3 /♭♭3) and Diminished 7th (°7/ ♭♭7) may need to be replaced with enharmonic equivalent intervals ♯2 and ♯6.

Chakra 12 : ADITYA CHAKRA
(Augmented 4th)



SYMBOLIC MEANING OF ADITYA CHAKRA
'Aditya' means 'Sun'. Metaphysically, it implies 'Light', as a sign of illumination of the mind which gets fully seated in its new- found reality. In this state, the seeker experiences total oneness with the Creative Force that pervades all of creation and becomes a completely enlightened being.
Aditya Chakra symbolizes that the one who has integrated the esoteric qualities of the 12 Chakras will be emancipated from the the delusory nature of the mind, and will experience the Light within.

MUSICAL MOTIF
Chakra 12 is the Augmented 4th counterpart of Chakra 6. While scales in Chakra 6 have a minor pentatonic quality, the raised 4th in Chakra 12 enhances the bluesy feel of these scales. For chord lovers, the scales in this chakra have so much to offer.
Examples of melodic motifs: 1-3-8-7-♯6-5-♯4-5-3-♯4-♯2-3-1/ 6-♭7-1-♯2-3-♭7-6-♯4-3-♯2 /1-3-5-♯4-3-♯4-♯2-3-1-♯2-♭7 / 5-♭6-♭7-8-♭7-10-♯9-♯11-10

EXAMPLE - Etude in Melakarta #72 - Rasika-priya TRACK12: p. 70 Piano TRACK 24: p. 98 Guitar

Melakarta Scale Workouts

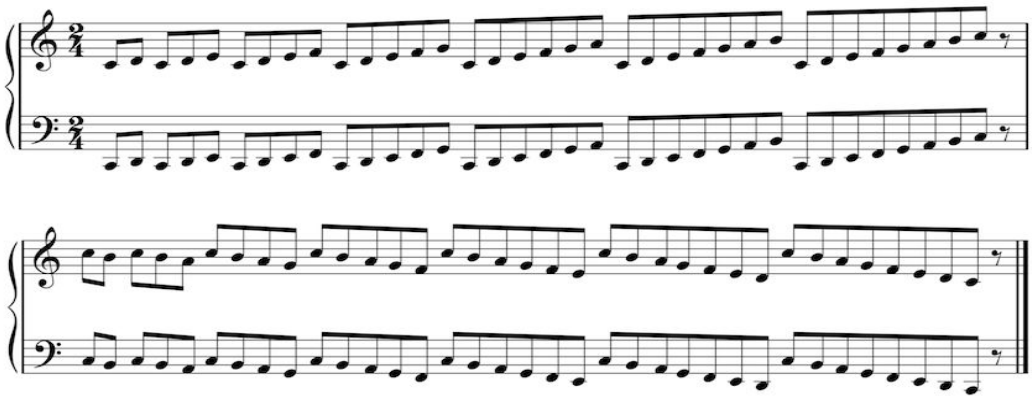
The following 5 workouts are presented in C Major (Melkarta #29), but must be practiced in the *12 Principal Melakarta Scales*, one key at a time, until the scales can be recognized by ear and the exercises are memorized. These exercises will enhance one's listening ability and improve dexterity with improvization in a multitude of scales.

The 12 Principal Melakarta Scales are #01, #08, #15, #22, #29, #36, #37, #44, #51, #58, #65, #72.

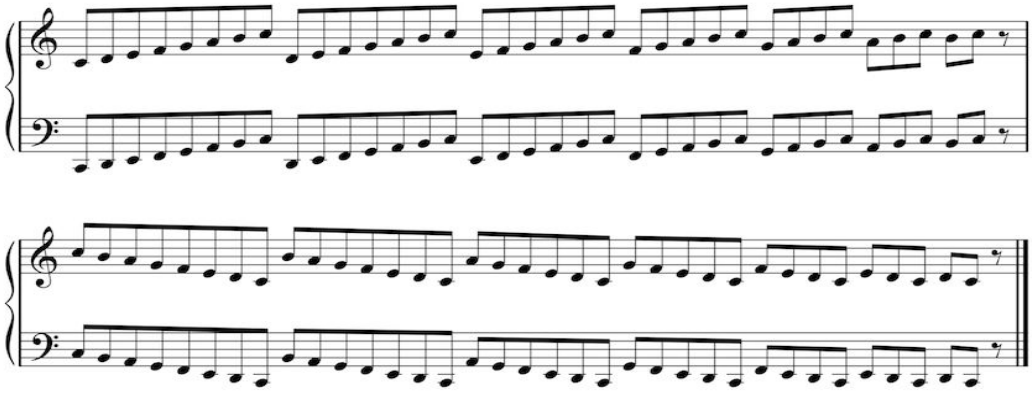
Melkarta #29 is the Major scale and could be replaced with #26 or #27 when performing these exercises.

1. Play any chosen scale a few times in a continuous loop before proceeding to the 4 workouts below. Work on one key at a time so that your ability to recognize the scale improves. No strict tempo markings are needed; just gradually increase your speed to develop proficiency. Play the exercises by memory eventually.

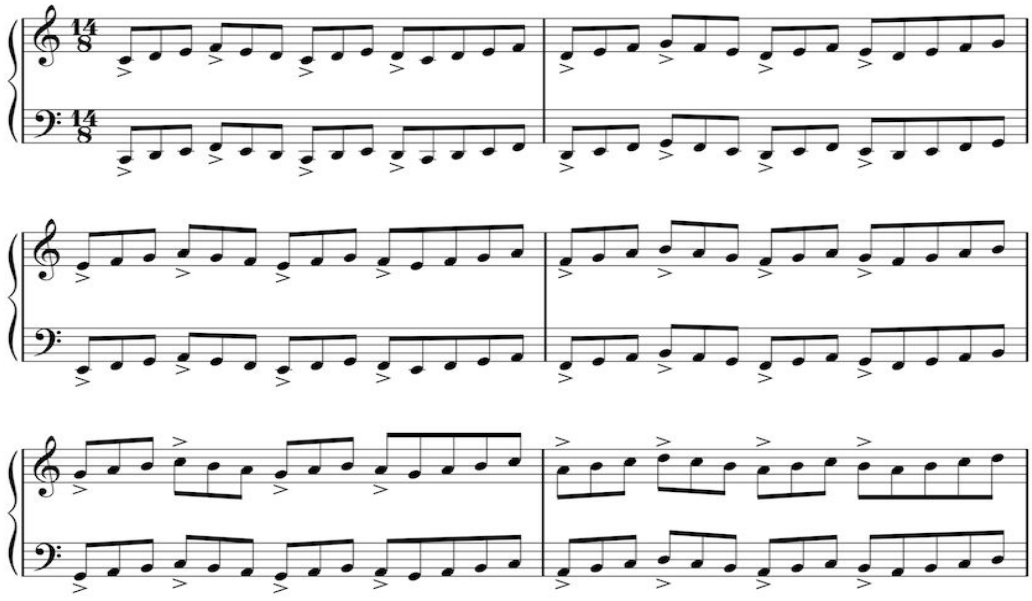
2. A simple exercise in linear scale movement, adding one note at a time, ascending and descending

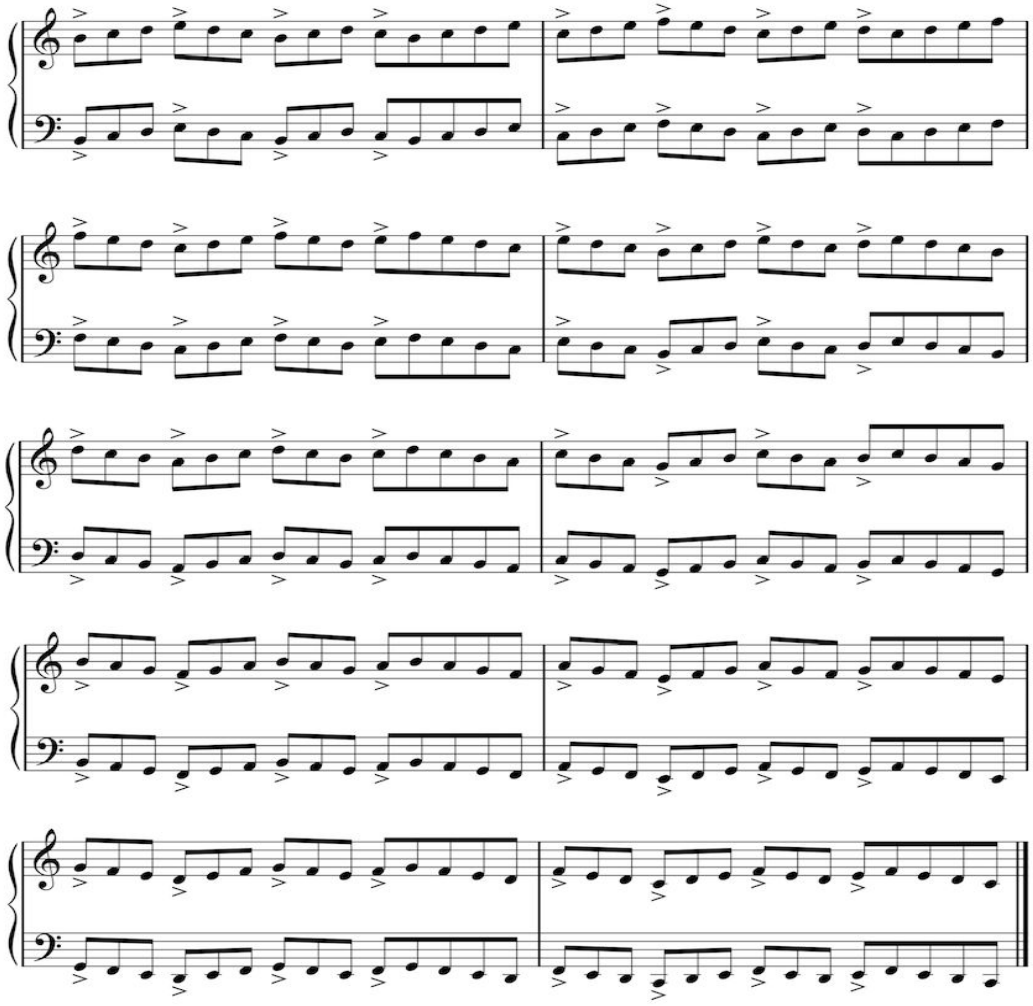


3. A simple exercise in linear scale movement, this time reducing one note at a time, on the ascent and descent.

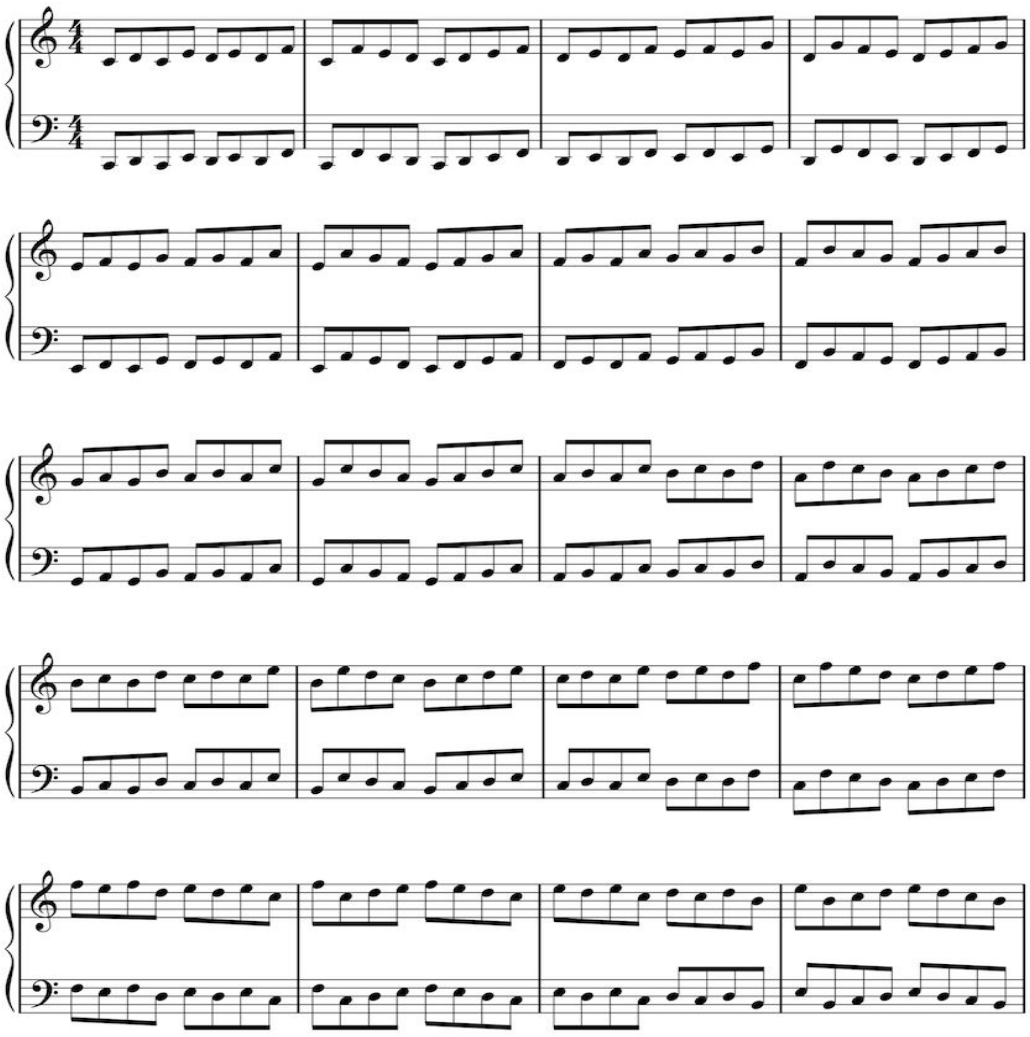


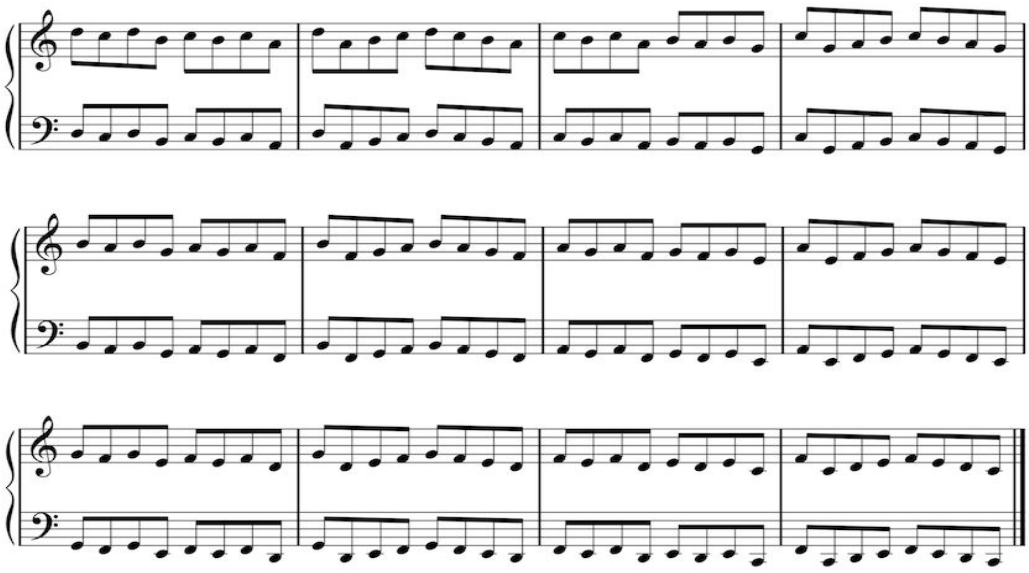
4. An interesting exercise in 14/8 with accents.





5. An exercise with intervals of 2nds, 3rds and 4ths.





Piano Etudes using Melakarta Scales

The etudes in this section are for intermediate to advanced level performers.

Expression markings are limited in order to allow the performer freedom of interpretation.

It is not unusual for piano scores to be free of fingering guidance, especially for players at this level. Hence, guidance has been provided only in a few sections which require atypical fingering technique.

The scale formula (scale signature) for each etude is provided at the top of the score in both Standard Scale Degrees and Adjusted Scale Degrees where applicable.

Play the scale a few times to familiarize yourself with the scale signature. Read the score as you would read any Western classical music score, bearing the scale signature in mind.

Each etude is sure to take you to a novel, fresh sounding musical landscape!

Scale Formula	1	♭2	2	4	5	♭6	6
Tonic = C	C	D♭	D	F	G	A♭	A

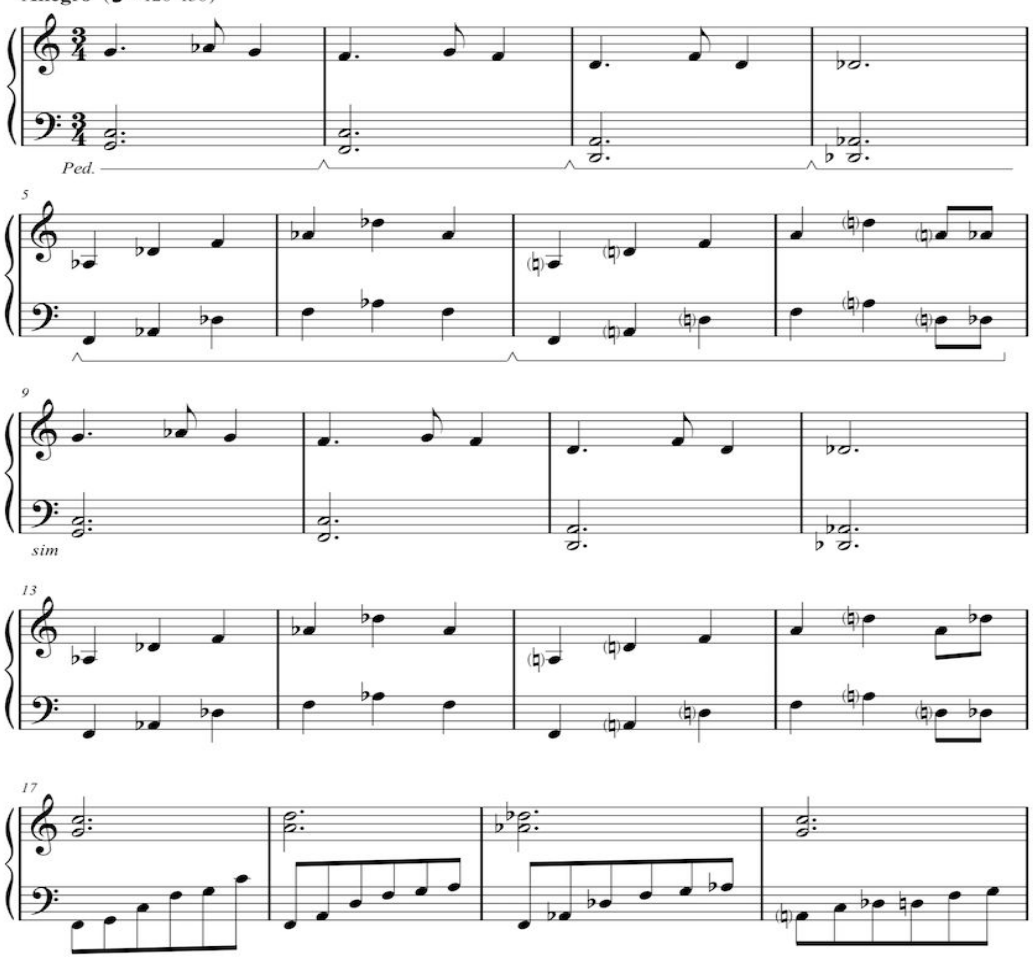
or

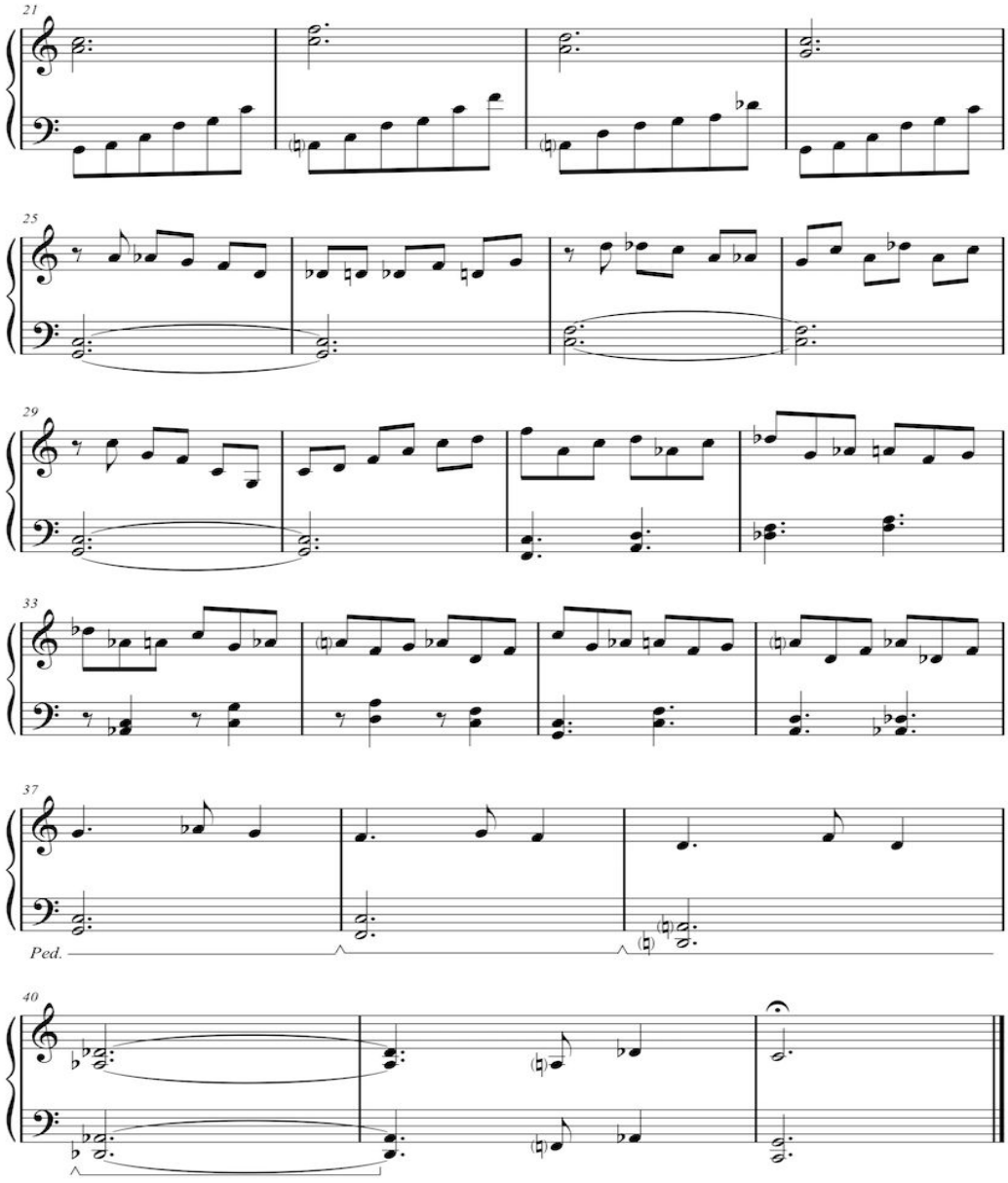
1	♭2	♭♭3	4	5	♭6	♭♭7
C	D♭	E♭♭	F	G	A♭	B♭♭

Etude in Melakarta #1 (Kana-kAngi)

Radhika Iyer

Allegro (♩ = 120-130)




21
25
29
33
37
Ped.
40

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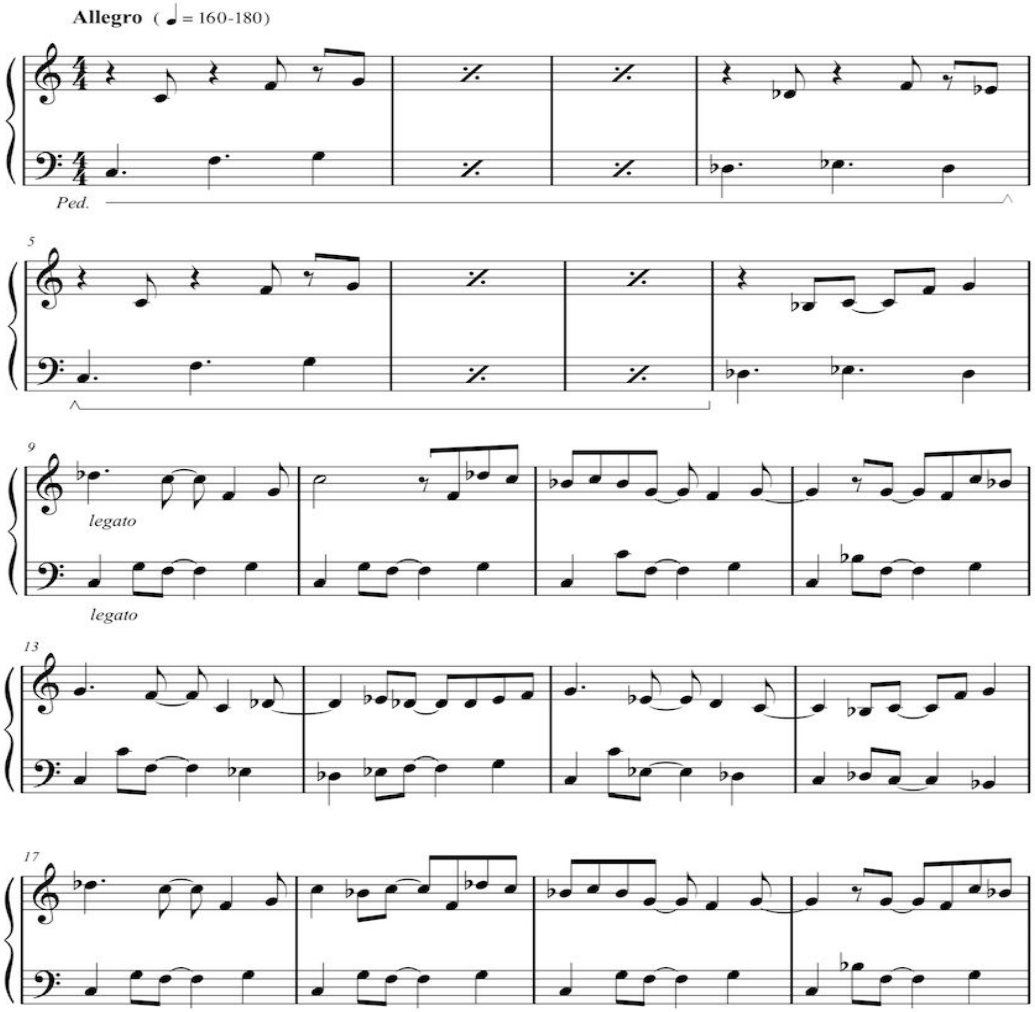
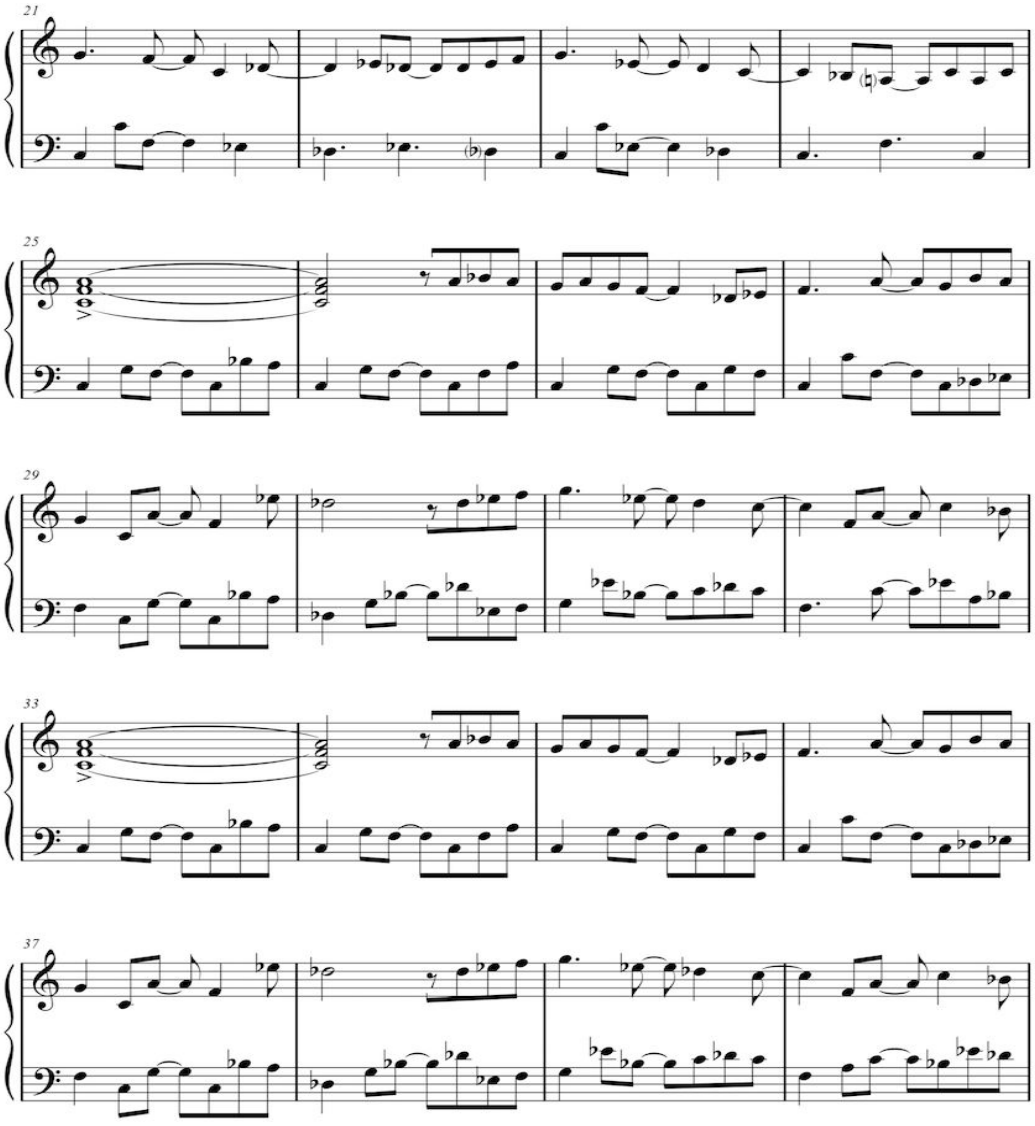
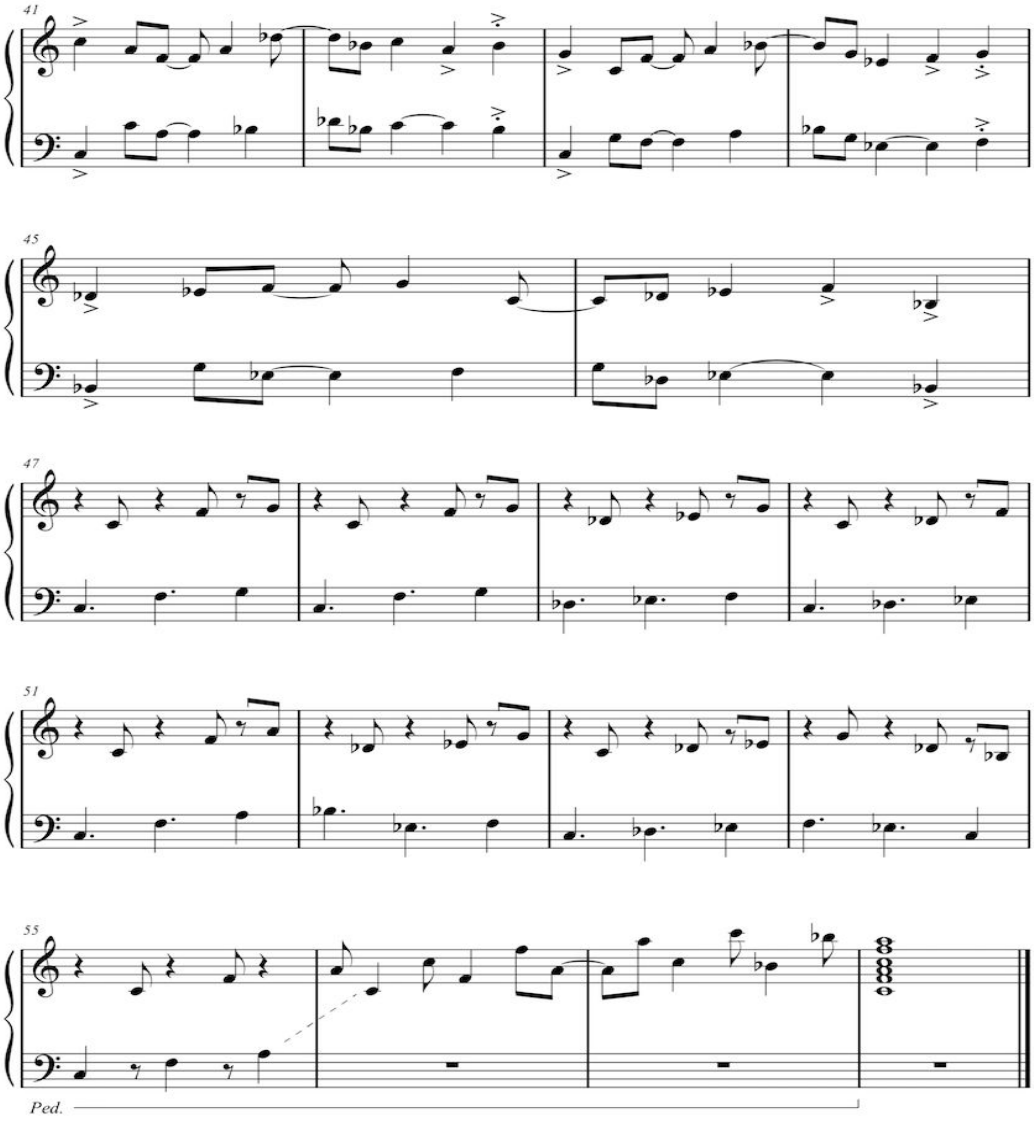
Scale Formula	1	♭2	♭3	4	5	6	♭7
Tonic = C	C	D♭	E♭	F	G	A	B♭

Etude in Melakarta #10 (NAtaka-priya)

Radhika Iyer



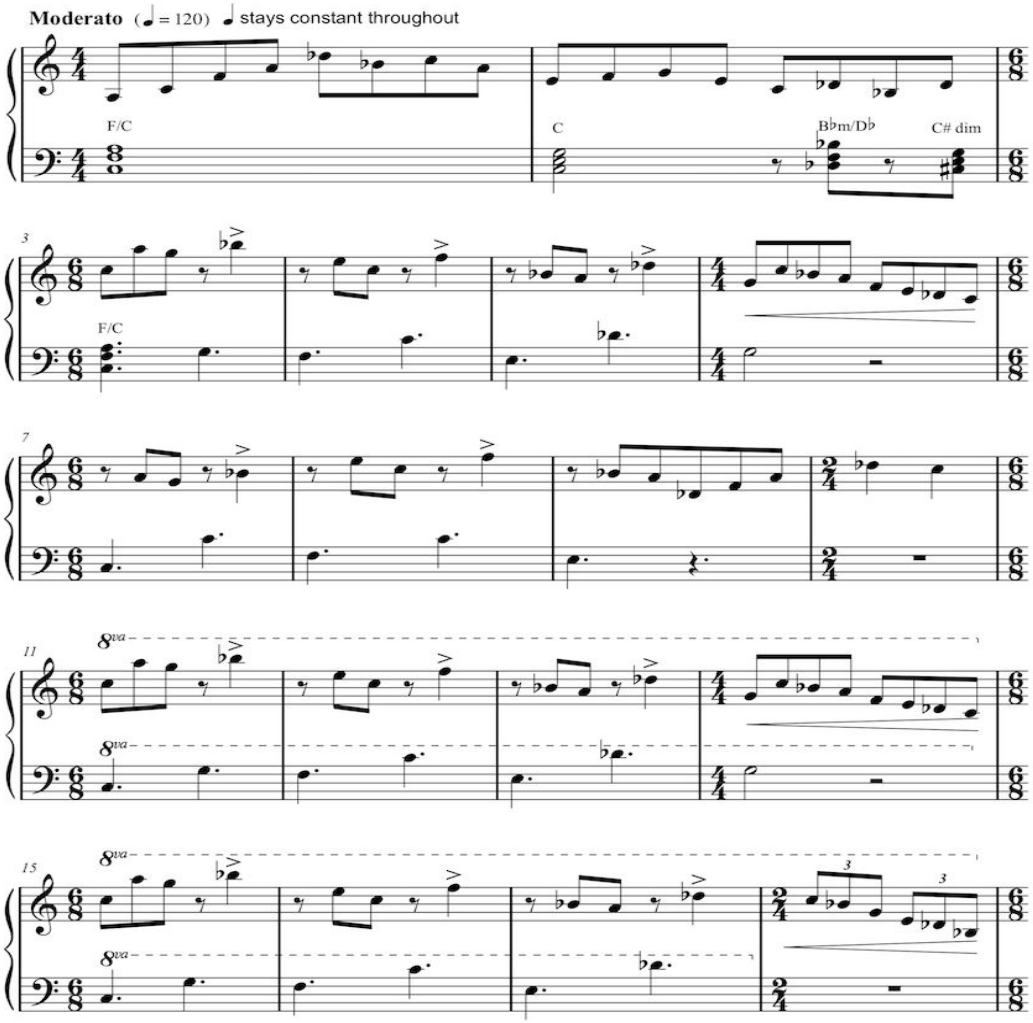


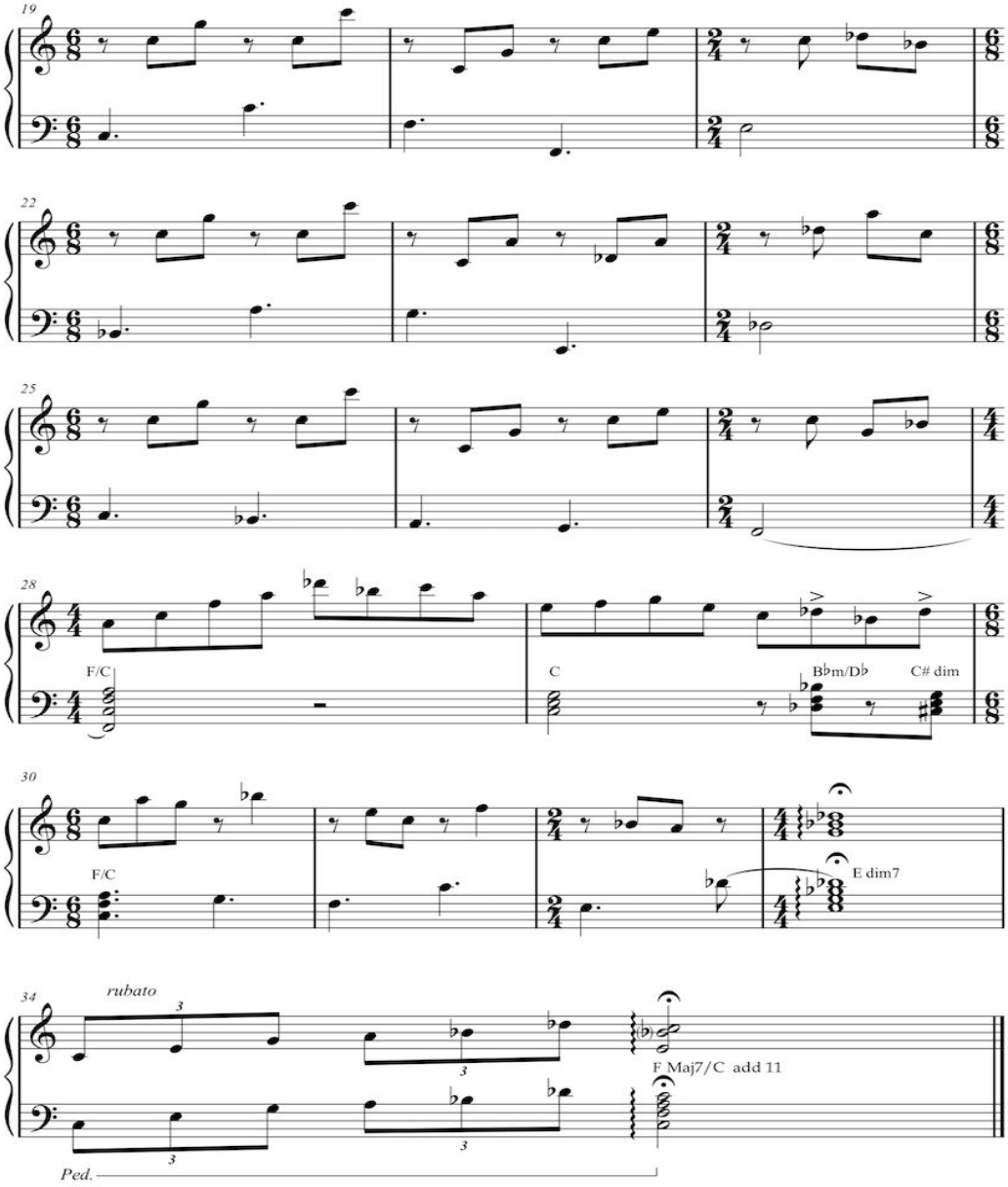

41
45
47
51
55
Ped.

Scale Formula	1	♭2	3	4	5	6	♭7
Tonic = C	C	D♭	E	F	G	A	B♭

Etude in Melakarta #16 (Chakra-vAkam)

Radhika Iyer
K. Srenevasan




19
22
25
28
F/C
C
B♭m/D♭
C# dim
30
F/C
E dim7
34
rubato
3
3
3
3
F Maj7/C add 11
Ped.

Scale Formula	1	2	♭3	4	5	♭6	6
Tonic = C	C	D	E♭	F	G	A♭	A

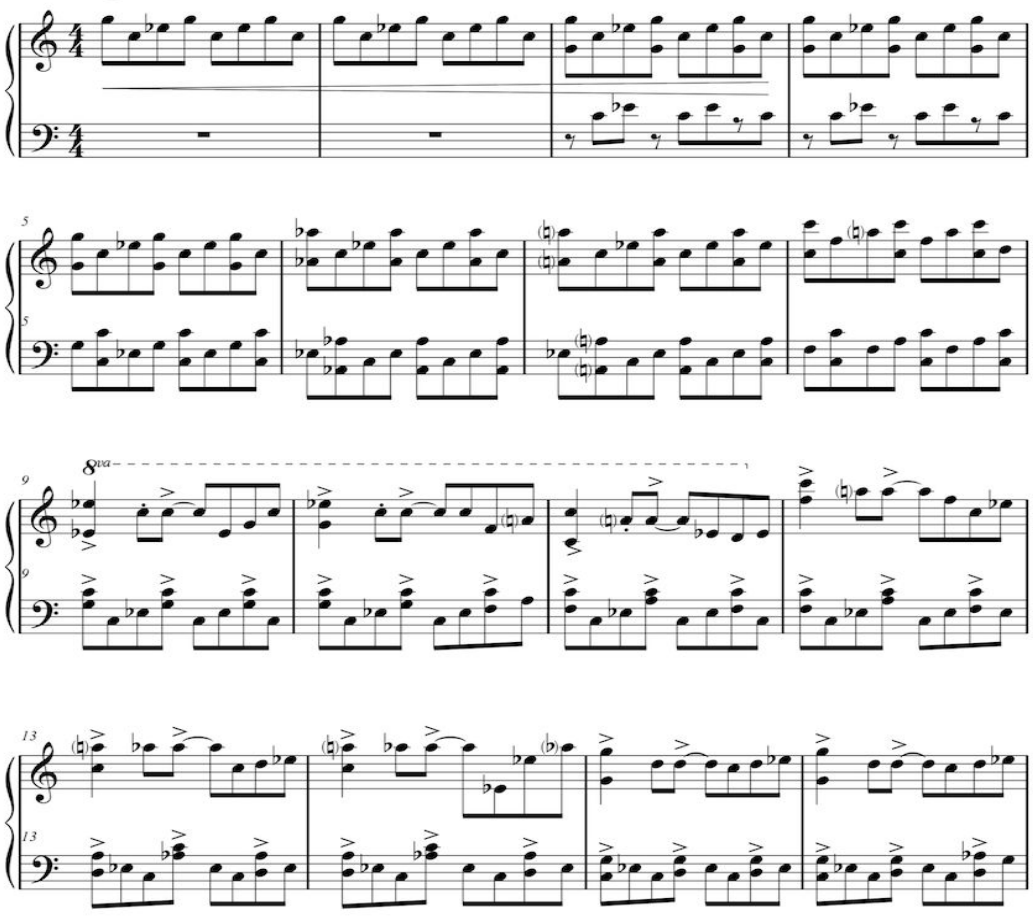
or

1	2	♭3	4	5	♭6	♭♭7
C	D	E♭	F	G	A♭	B♭♭

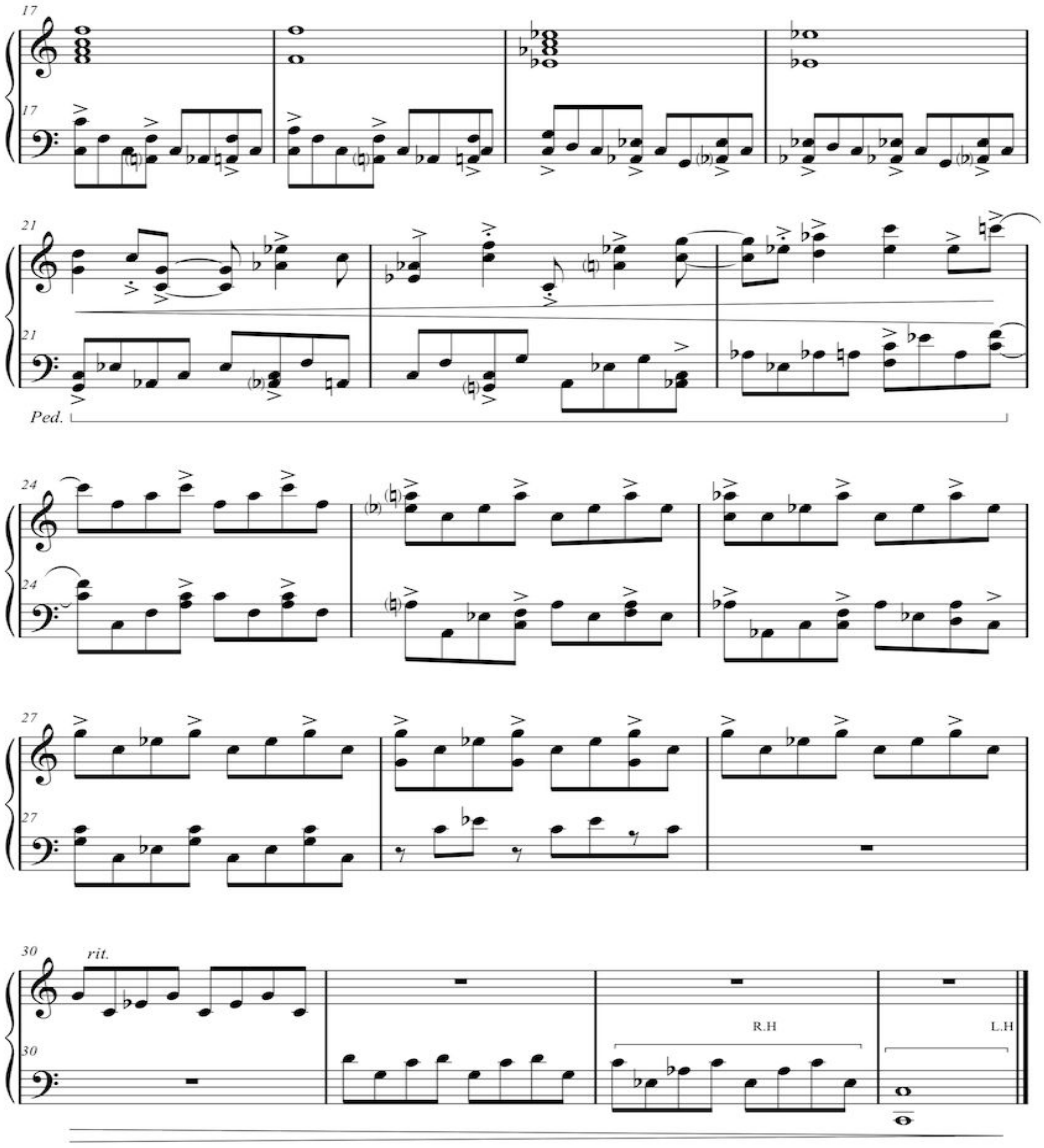
Etude in Melakarta #19 (JhankAra-dhwani)

Radhika Iyer

Allegro-Moderato (♩ = 90-135)



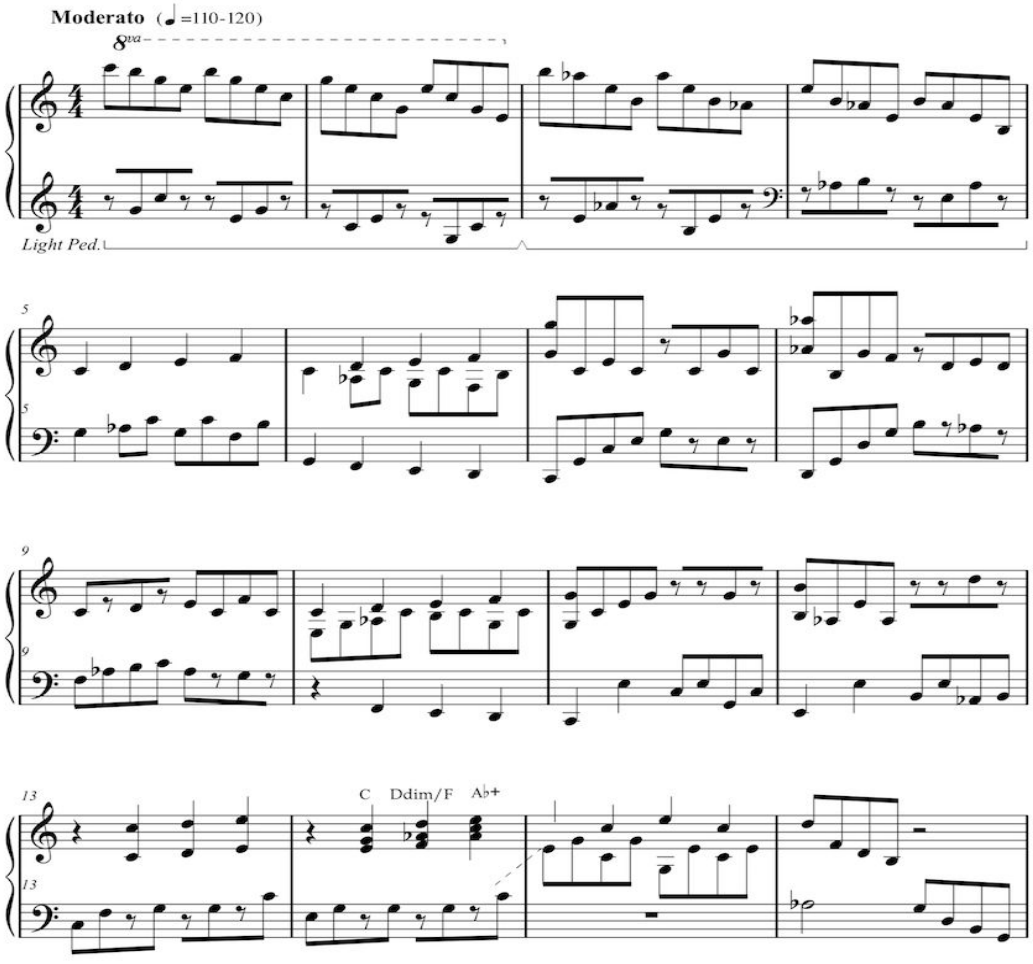
Etude in Melakarta #19 (JhankAra-dhwani)



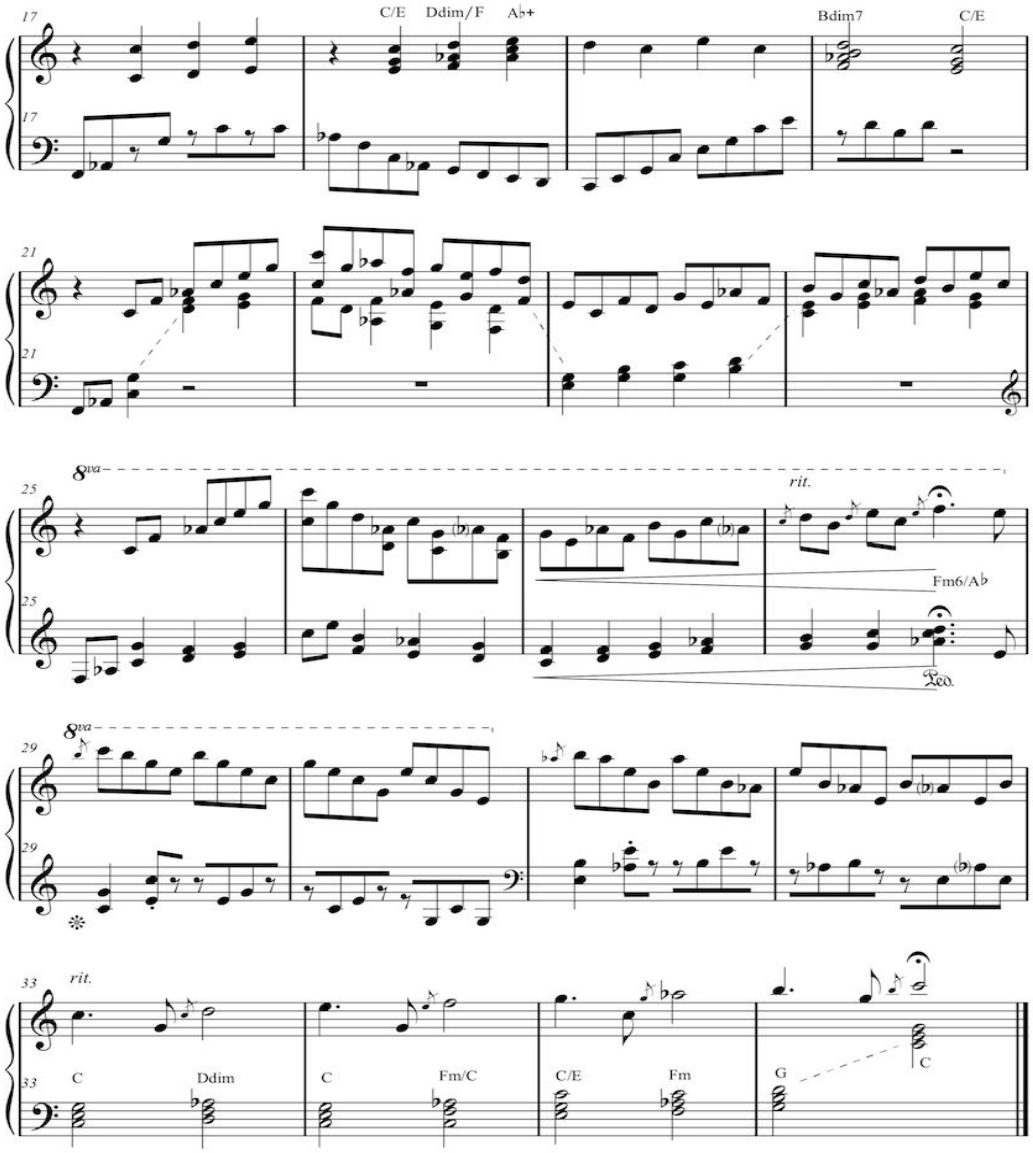
Scale Formula	1	2	3	4	5	♭6	7
Tonic = C	C	D	E	F	G	A♭	B

Etude in Melakarta #27 (Sara-sAngi)

Radhika Iyer
S.Sambasevam



Etude in Melakarta #27 (Sara-sAngi)



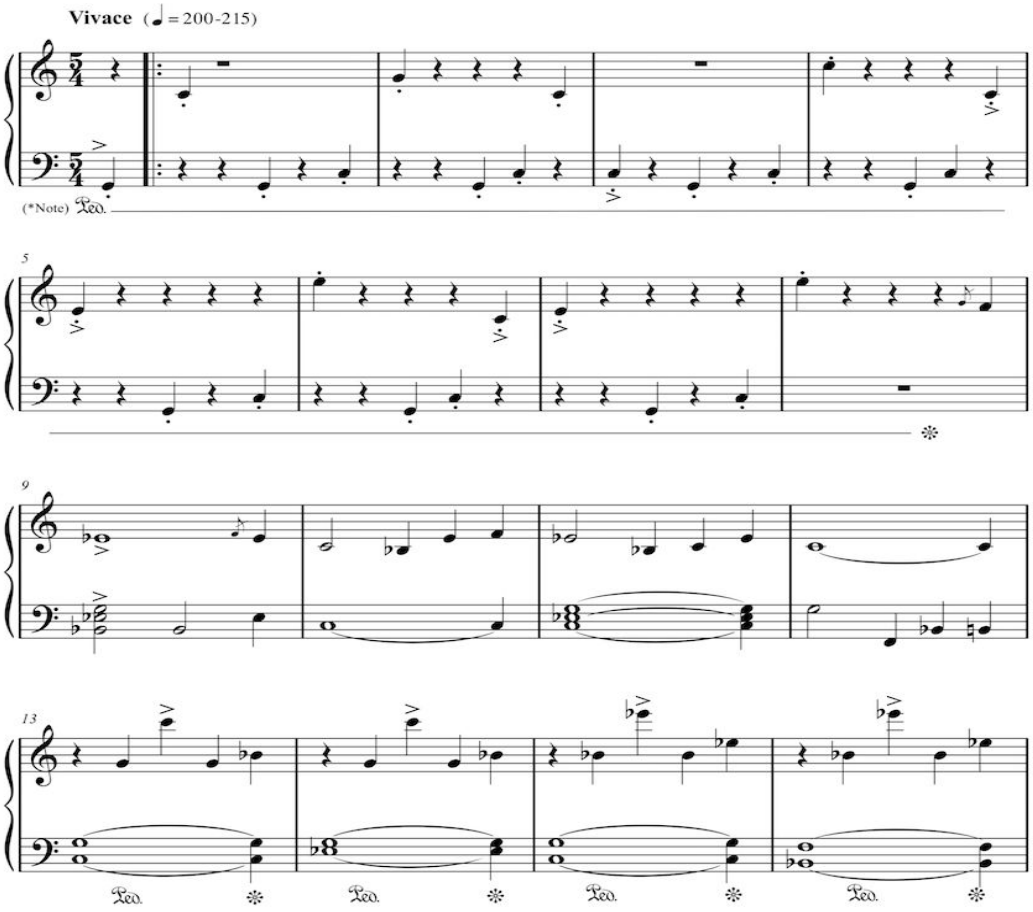
Scale Formula	1	♭3	3	4	5	♭7	7
Tonic = C	C	E♭	E	F	G	B♭	B

or

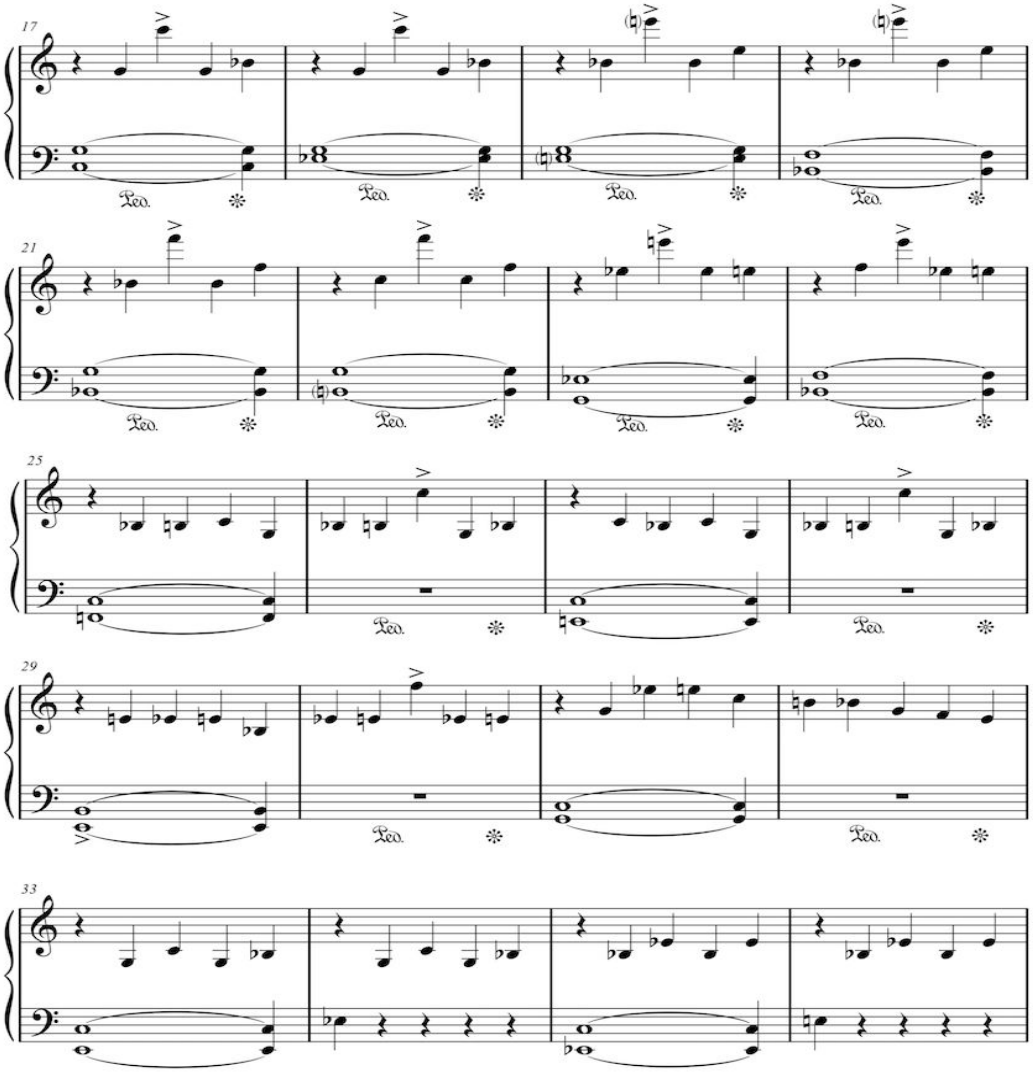
1	♯2	3	4	5	♯6	7
C	D♯	E	F	G	A♯	B

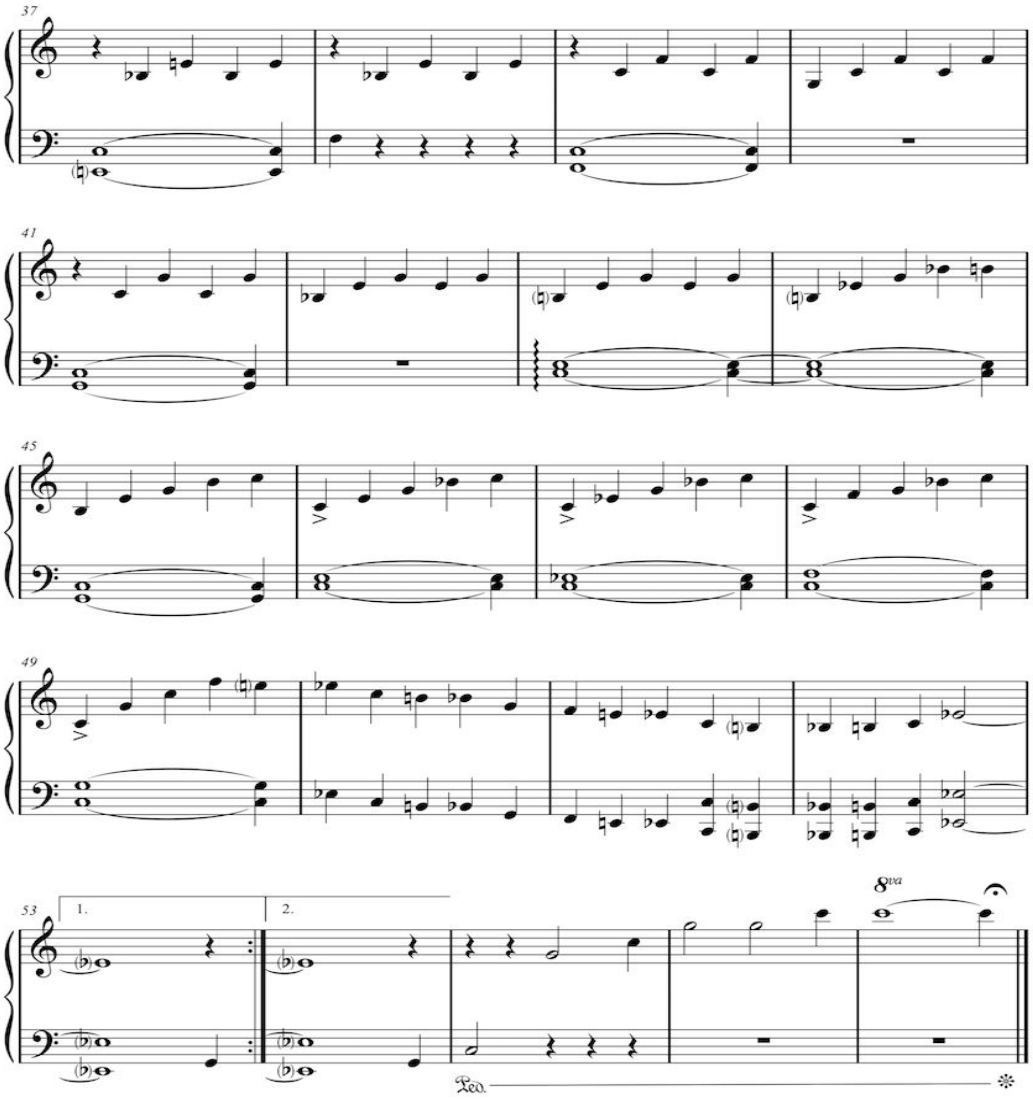
Etude in Melakarta #36 (Chala-nAta)

Radhika Iyer



*Staccato with pedal will result in a nice bell-like swing effect.


17
Ped.
21
25
29
33


37
41
45
49
53
1.
2.
8va
Ped.

Scale Formula	1	♭2	2	♯4	5	♭6	6
Tonic = C	C	D♭	D	F♯	G	A♭	A

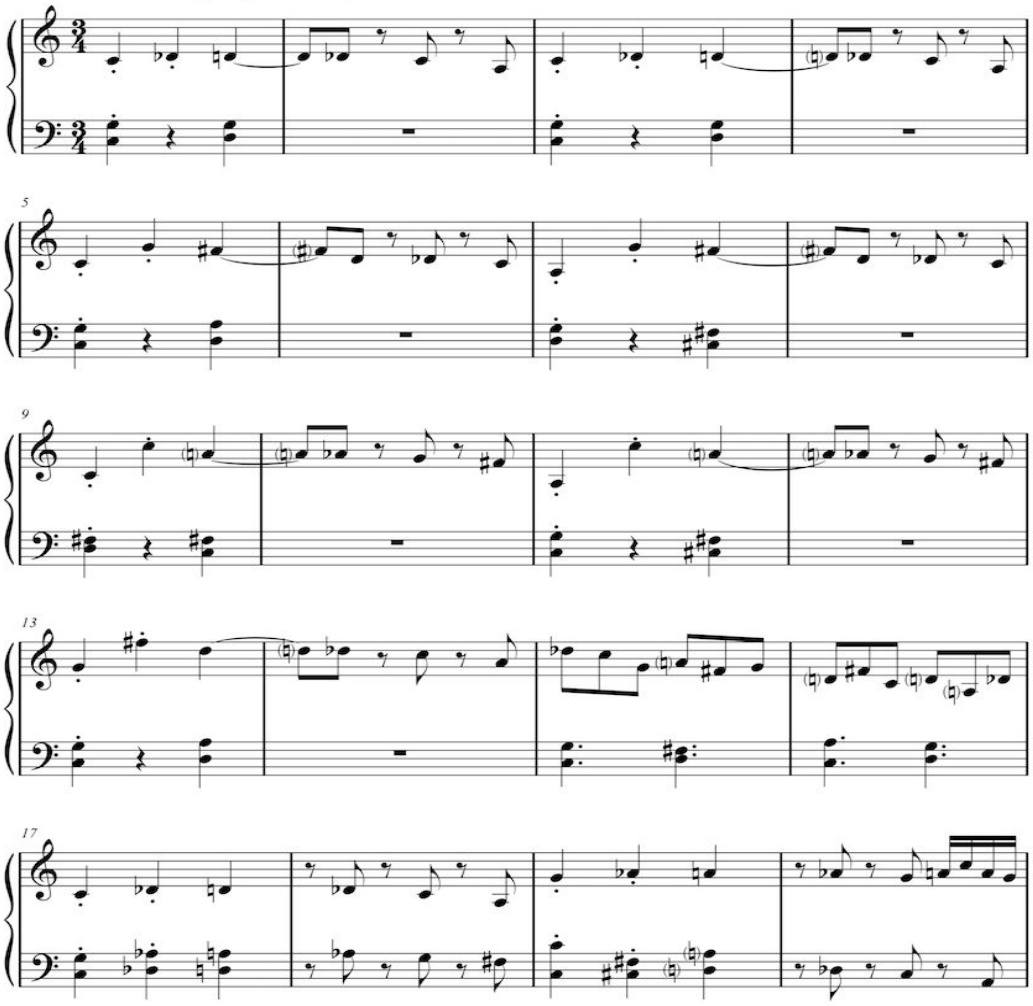
or

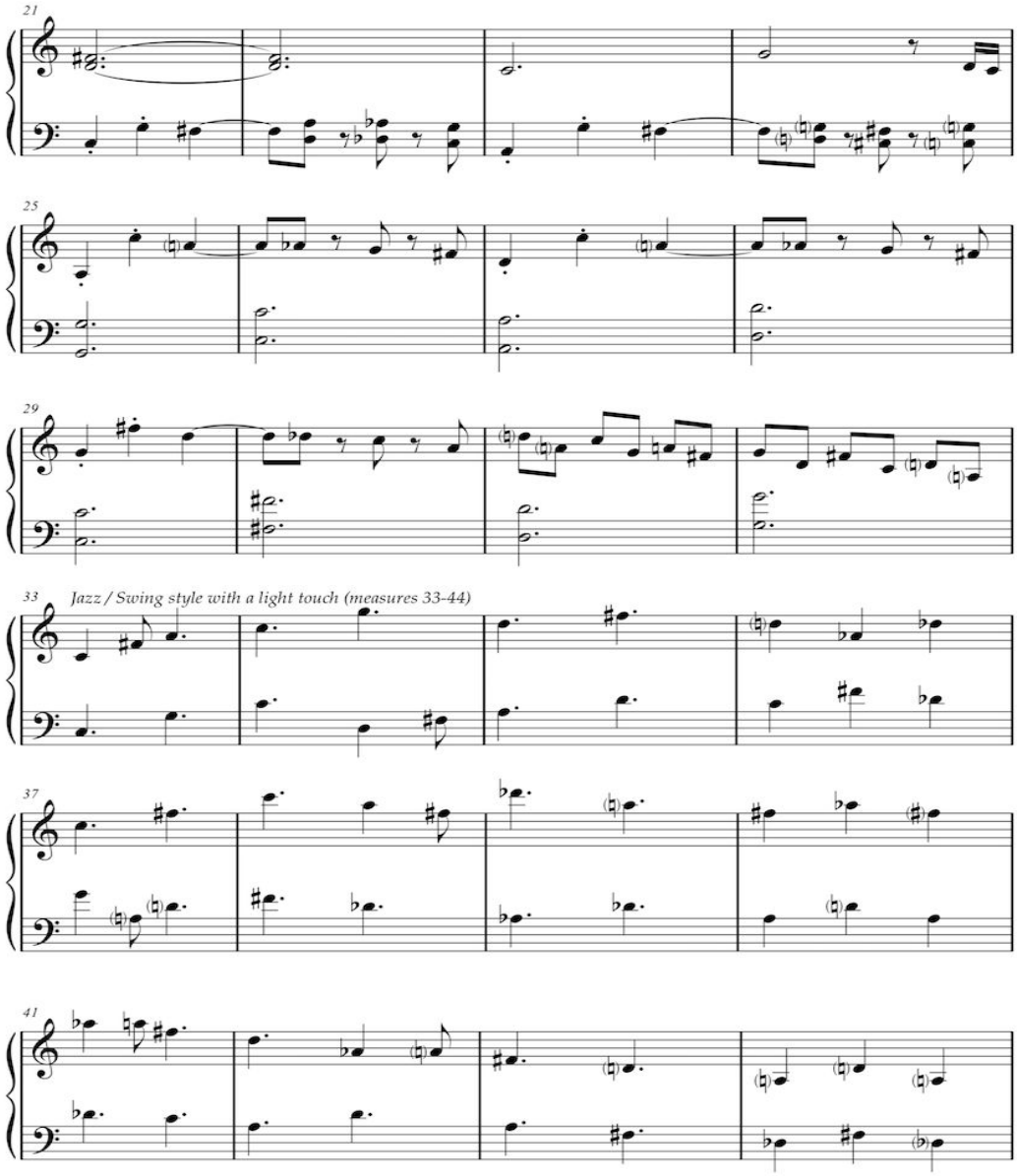
1	♭2	♭♭3	♯4	5	♭6	♭♭7
C	D♭	E♭♭	F♯	G	A♭	B♭♭

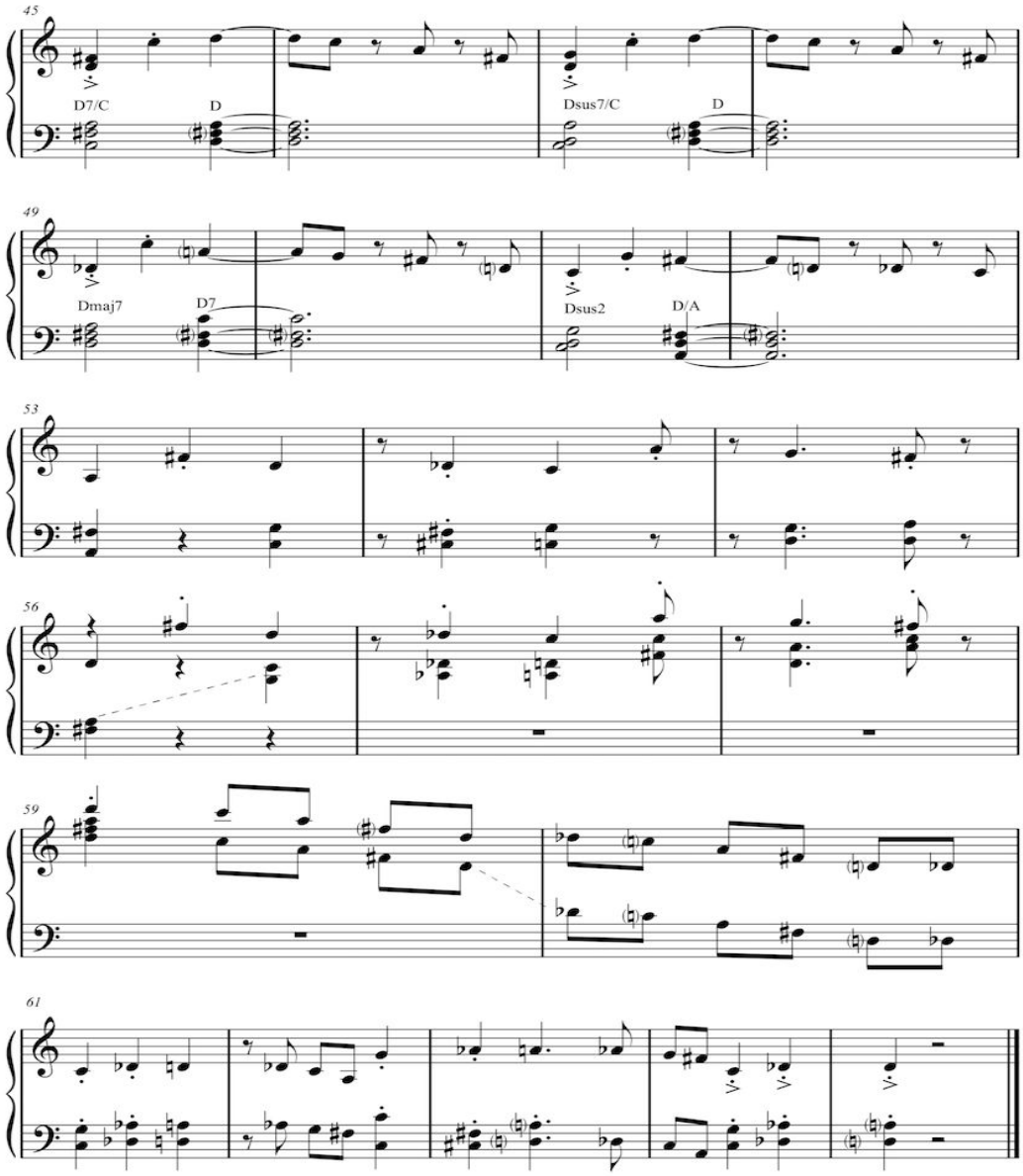
Etude in Melakarta #37 (SAlagam)

Radhika Iyer

Moderato - Allegro (♩ = 140-180)



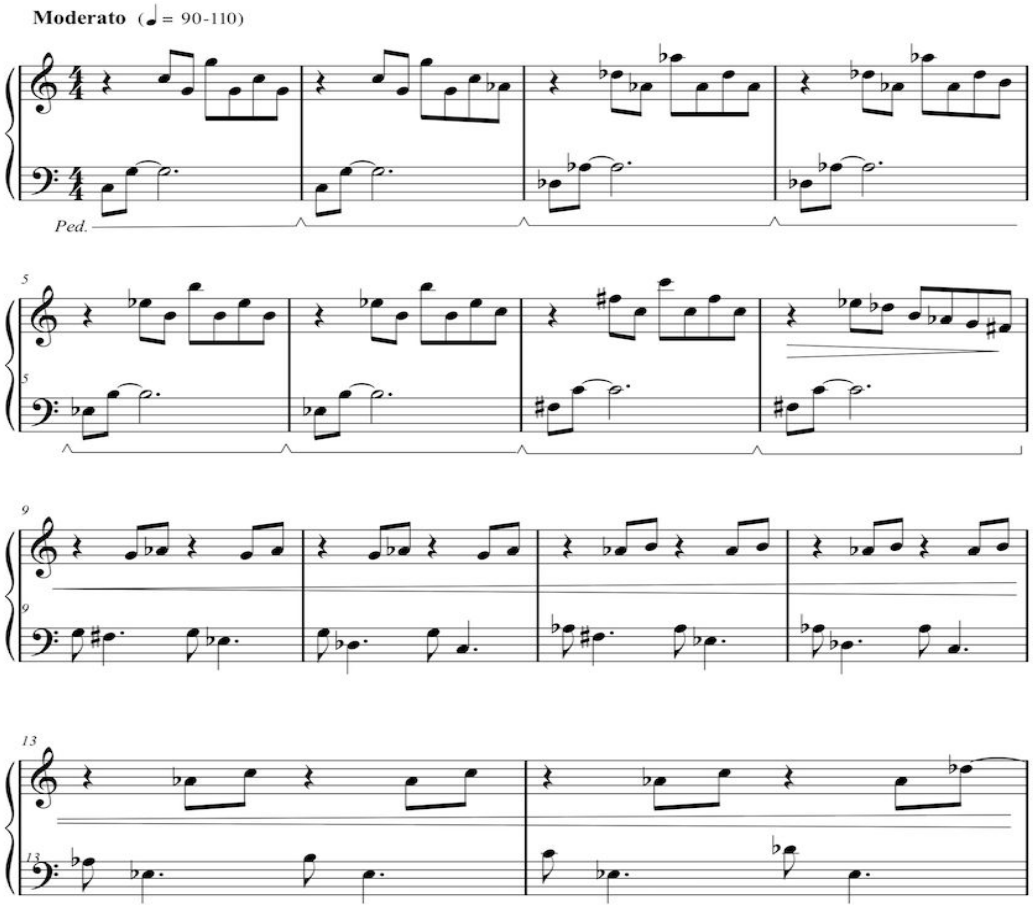

21
25
29
33
Jazz / Swing style with a light touch (measures 33-44)
37
41

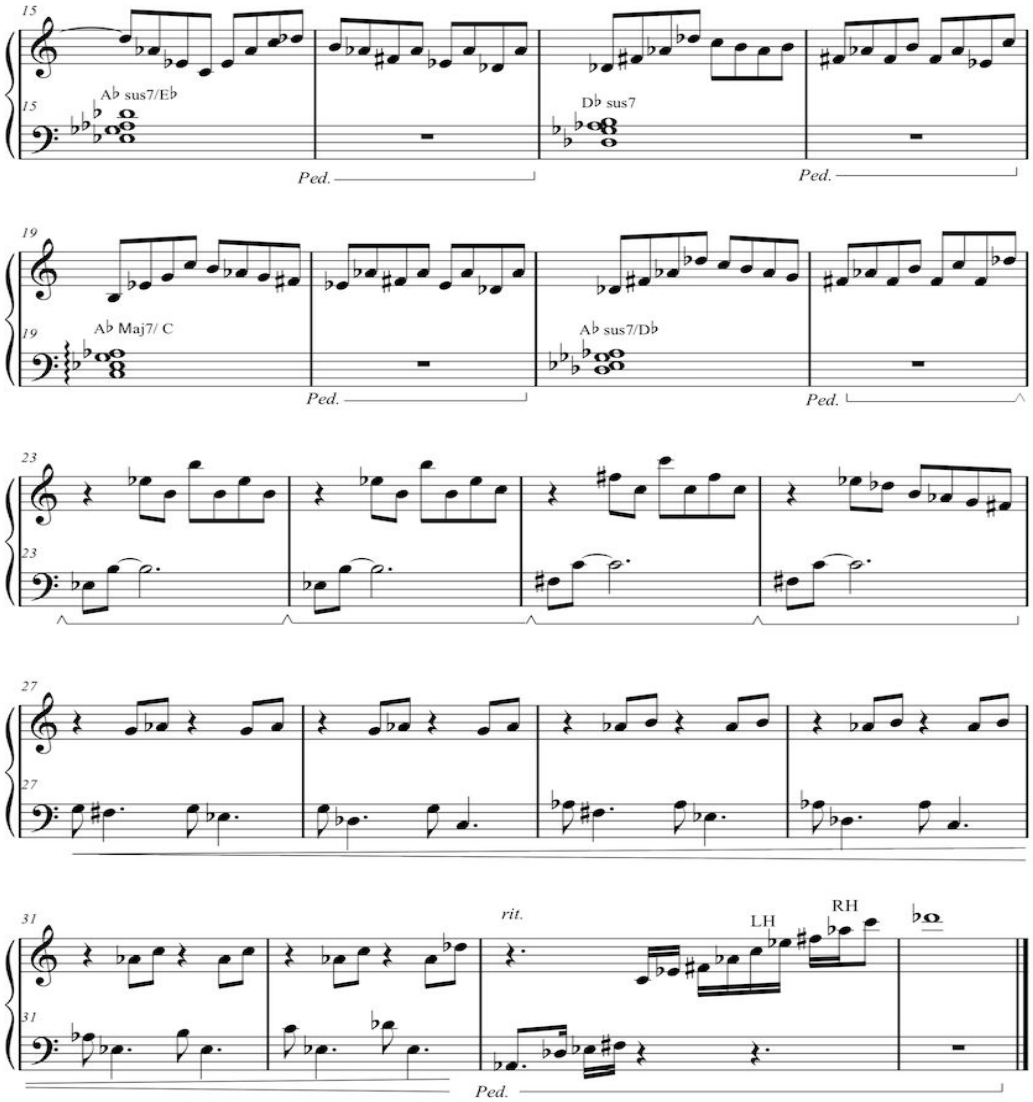

45
D7/C
D
Dsus7/C
D
49
Dmaj7
D7
Dsus2
D/A
53
56
59
61

Scale Formula	1	♭2	♭3	♯4	5	♭6	7
Tonic = C	C	D♭	E♭	F♯	G	A♭	B

Etude in Melakarta #45 (Shuba-panthu-varAli)

Radhika Iyer




15
A♭ sus7/E♭
D♭ sus7
Ped.
Ped.
19
A♭ Maj7/ C
A♭ sus7/D♭
Ped.
Ped.
23
27
31
rit.
LH
RH
Ped.

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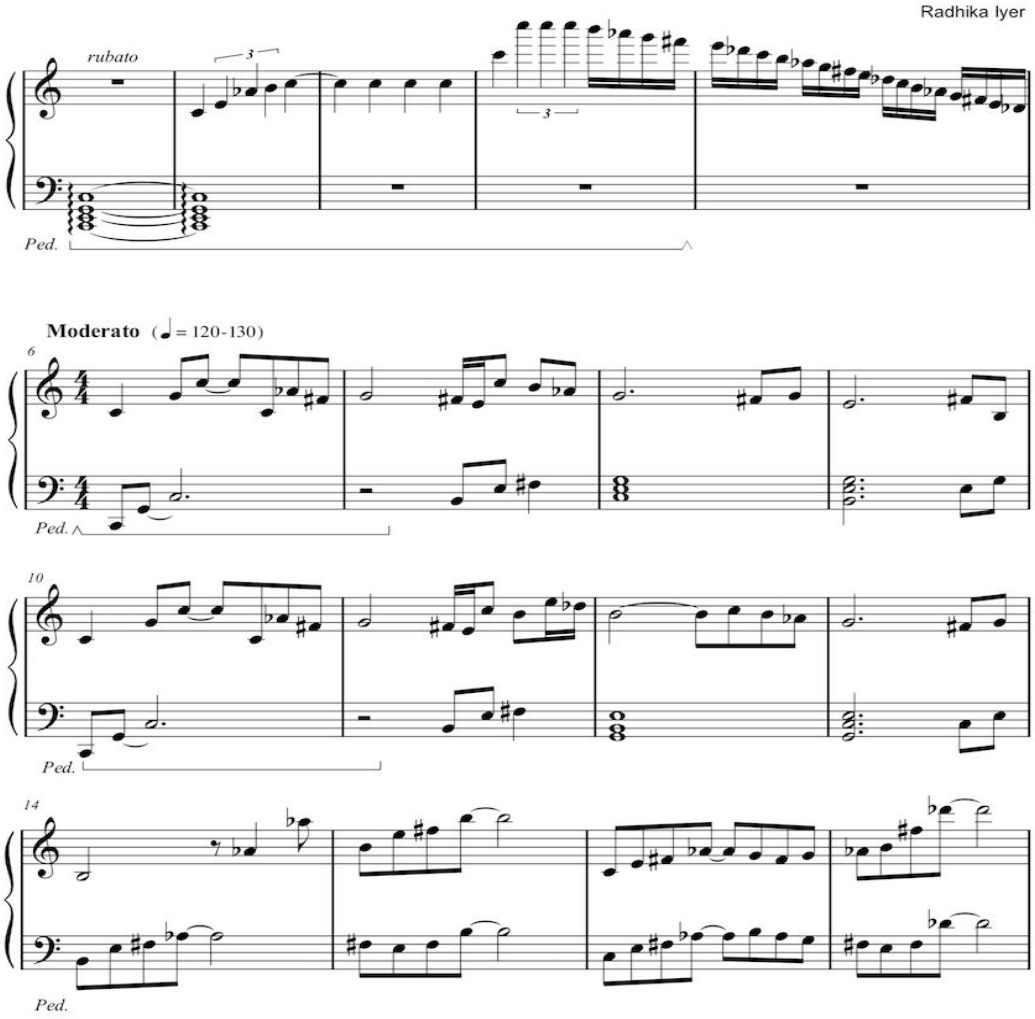
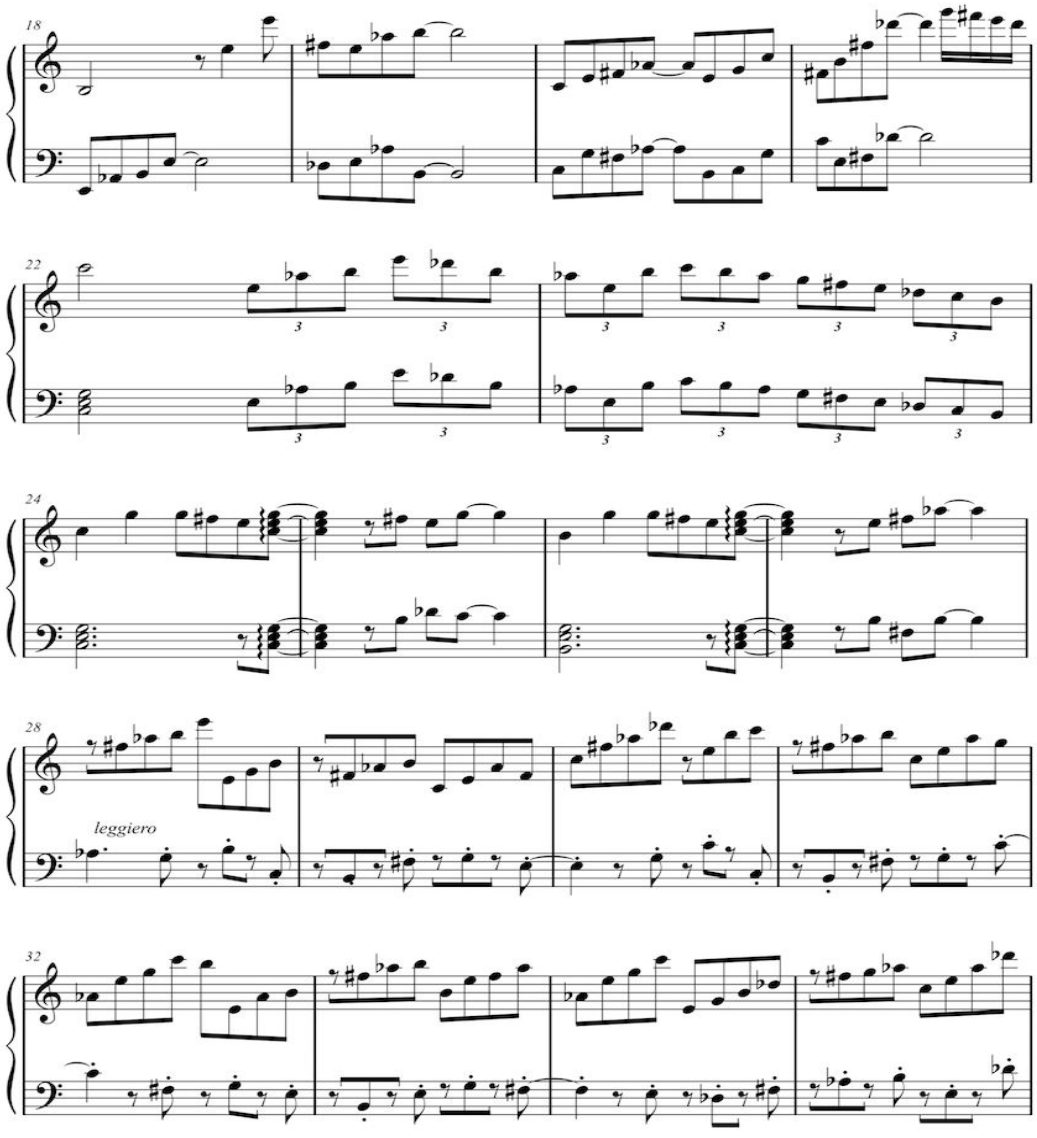
Scale Formula	1	♭2	3	♯4	5	♭6	7
Tonic = C	C	D♭	E	F♯	G	A♭	B

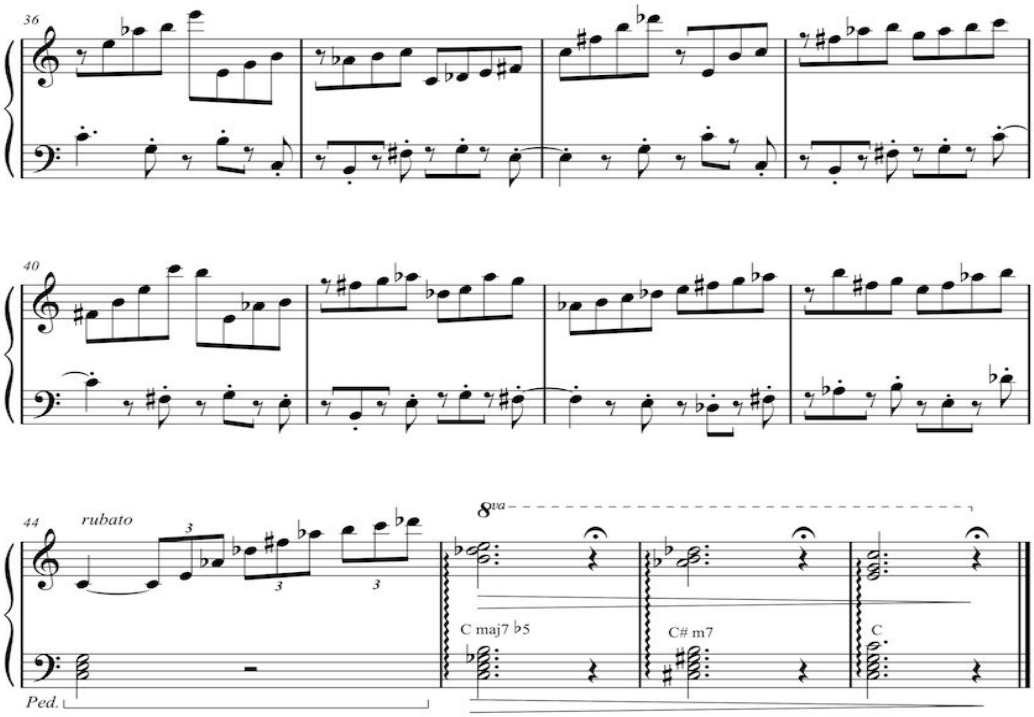
Etude in Melakarta #51 (KAma-vardhini)

Radhika Iyer




18
22
24
28
leggiero
32

Etude in Melakarta #51 (KAma-vardhini)

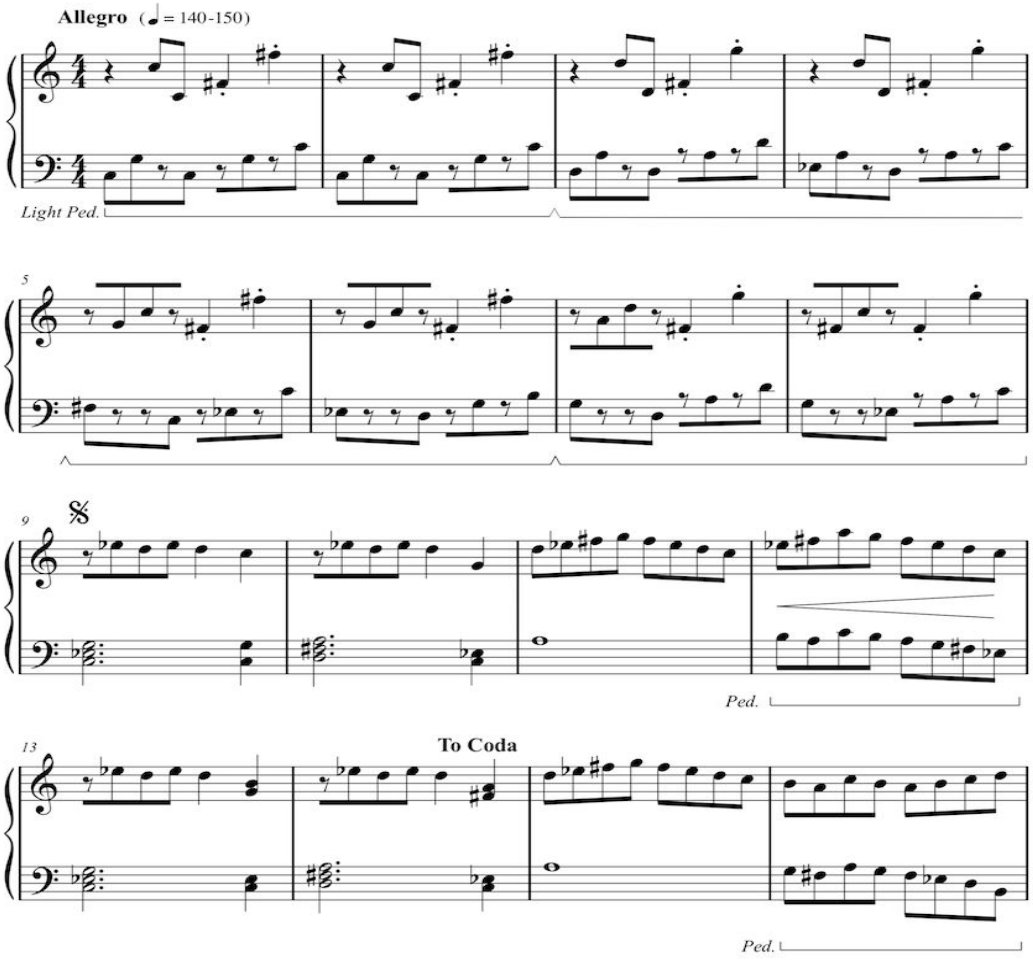


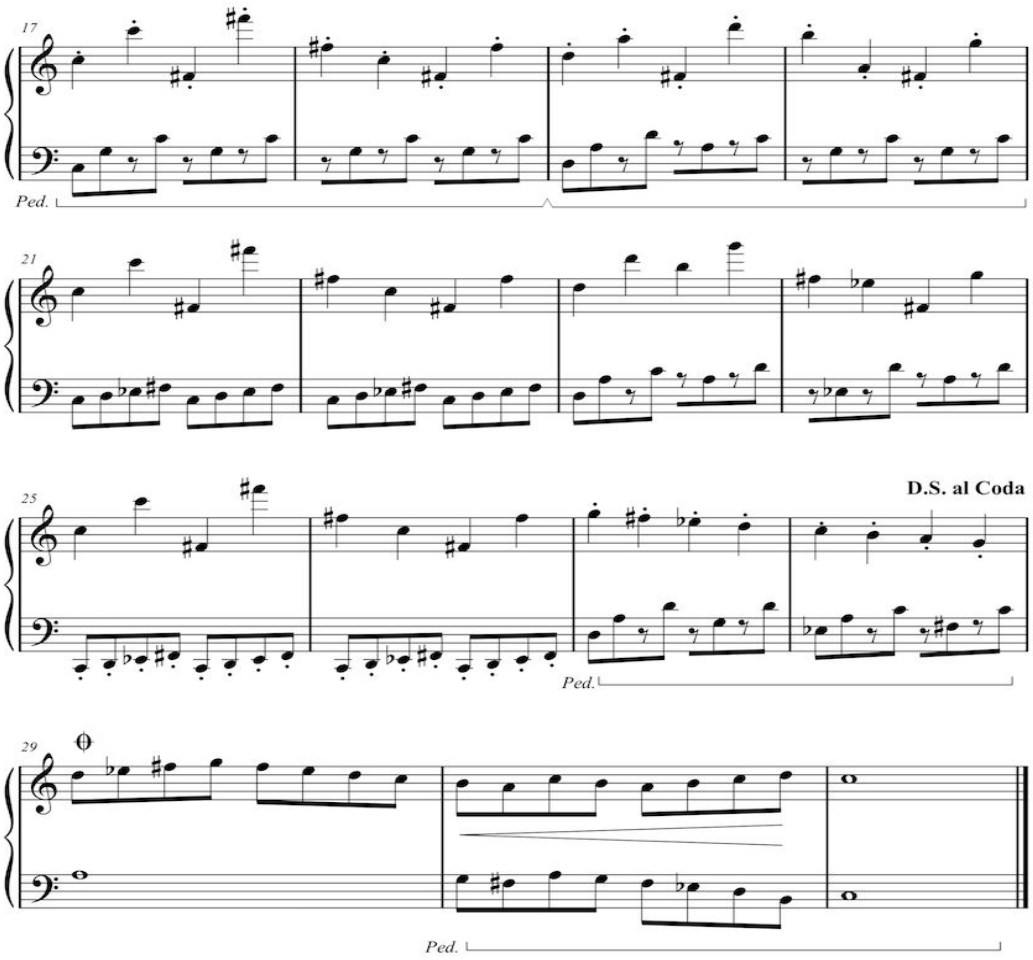
Scale Formula	1	2	♭3	♯4	5	6	7
Tonic = C	C	D	E♭	F♯	G	A	B

Etude in Melakarta #59 (Dharma-vathi)

10

Radhika Iyer
K.Srenevasan

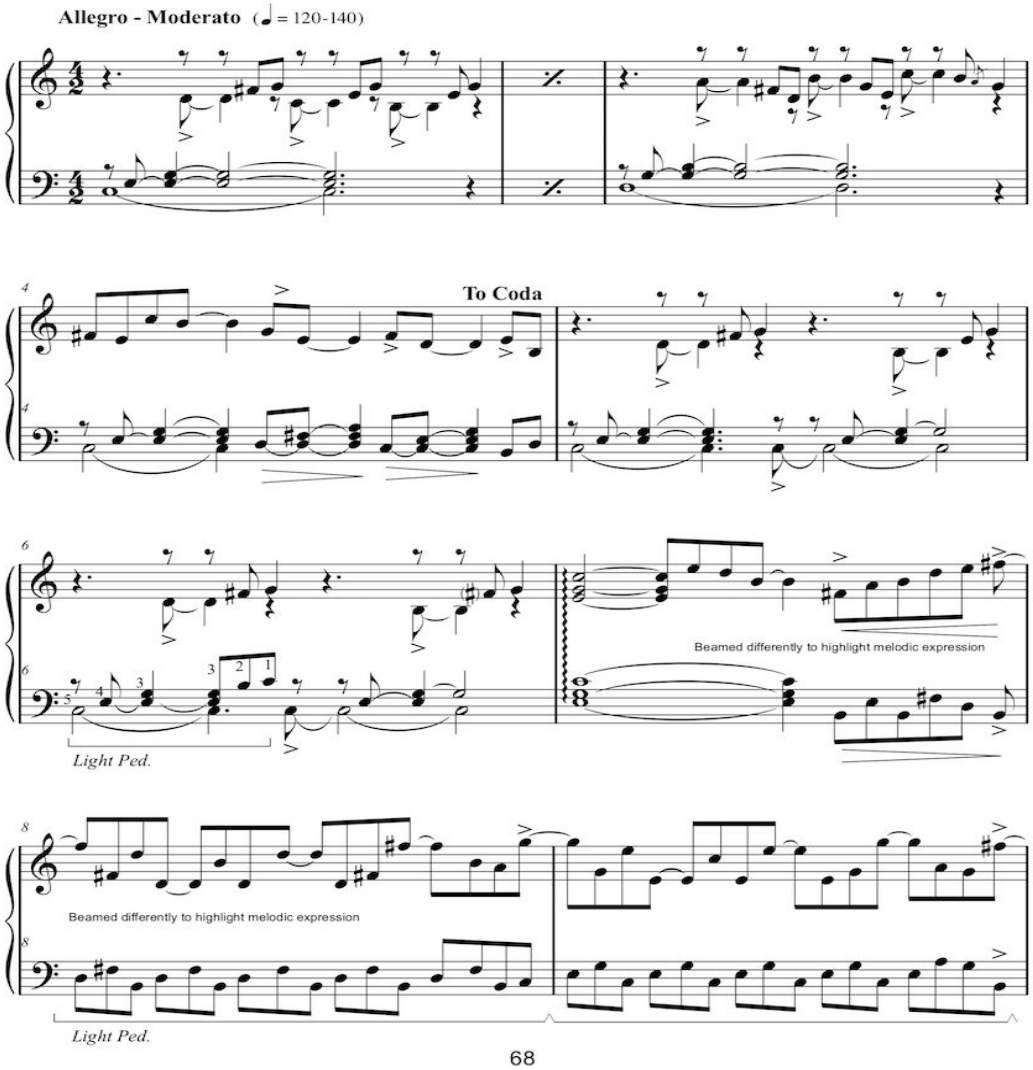


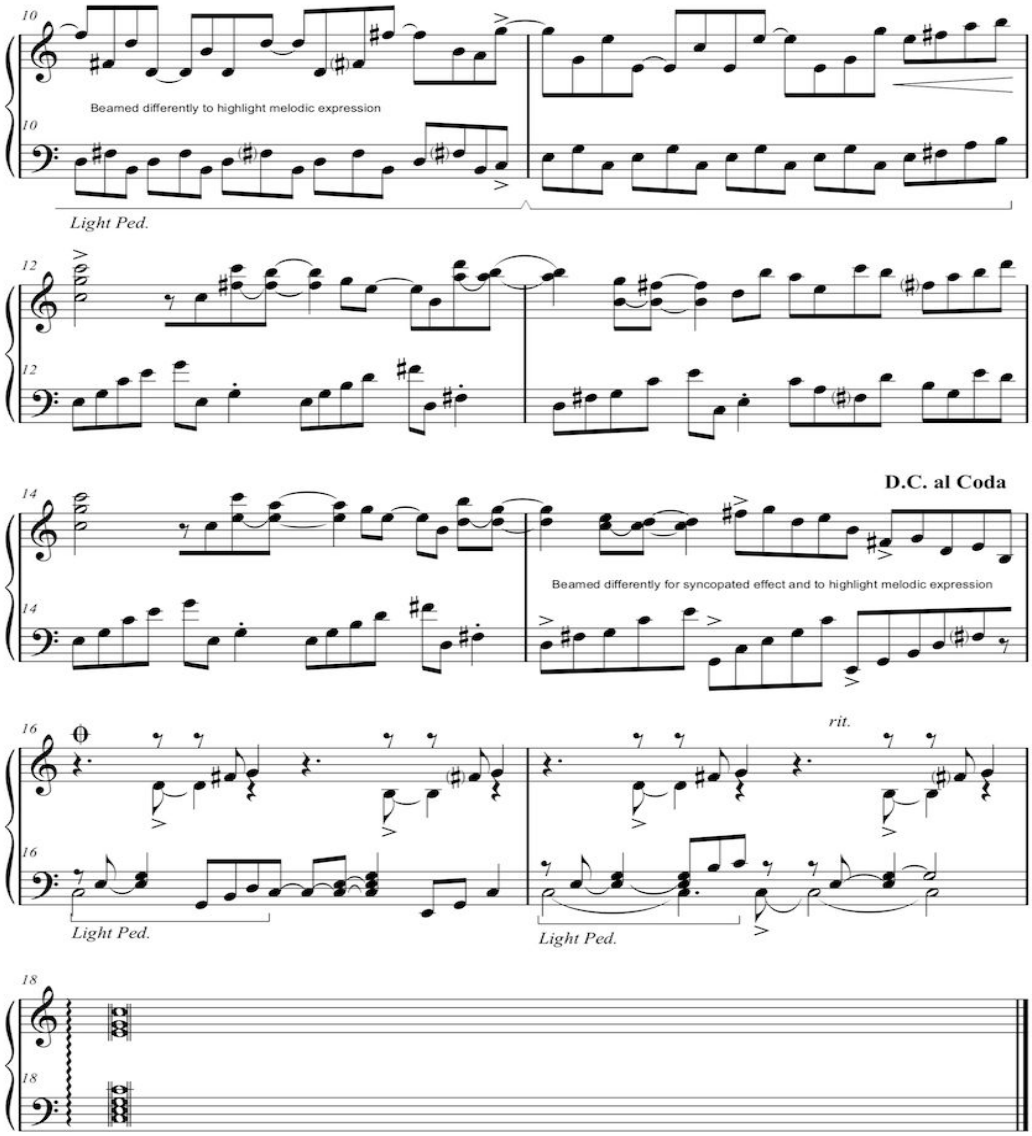

17
Ped.
21
25
D.S. al Coda
Ped.
29
Ped.

Scale Formula	1	2	3	♯4	5	6	7
Tonic = C	C	D	E	F♯	G	A	B

Etude in Melakarta #65 (Mecha-Kalyani)/(Lydian)

Radhika Iyer




10
Beamed differently to highlight melodic expression
Light Ped.
12
14
D.C. al Coda
Beamed differently for syncopated effect and to highlight melodic expression
16
rit.
Light Ped.
Light Ped.
18

Scale Formula	1	♭3	3	♯4	5	♭7	7
Tonic = C	C	E♭	E	F♯	G	B♭	B

or

1	♯2	3	♯4	5	♯6	7
C	D♯	E	F♯	G	A♯	B

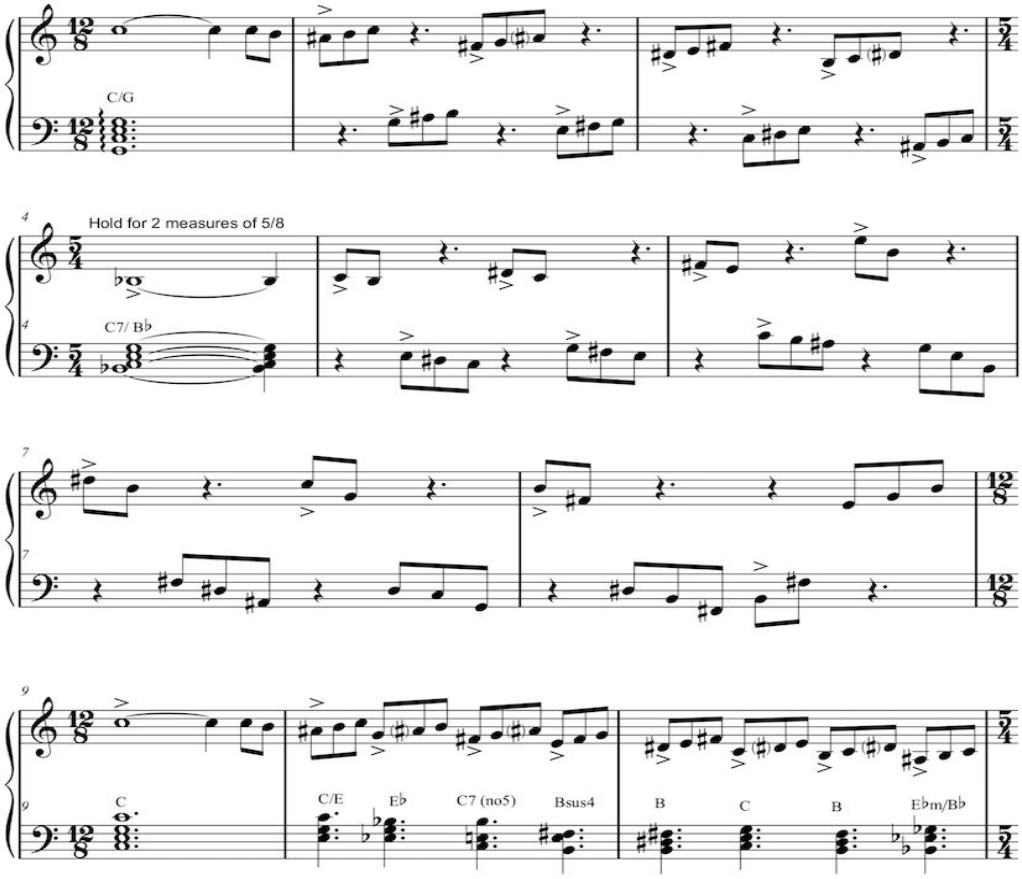
Etude in Melakarta #72 (Rasika-priya)

12

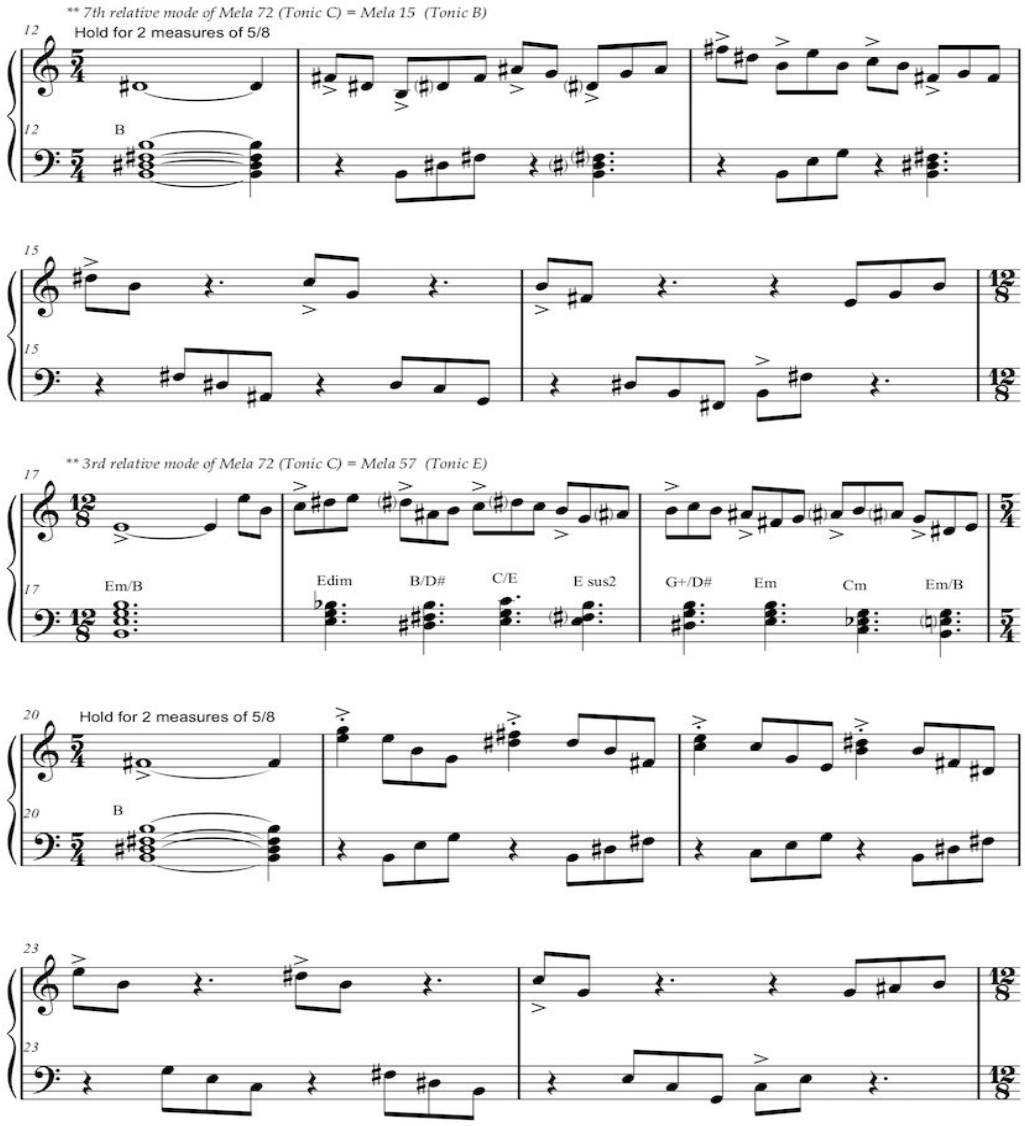
Radhika Iyer

** Note : Time signatures 12/8 and 5/4

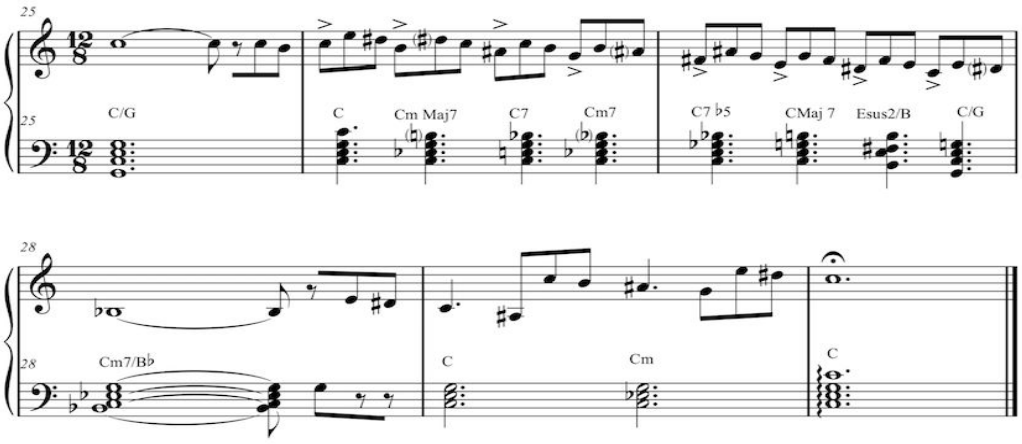
Allegro-Moderato (♩. = 100-120) ♪ stays constant throughout



Etude in Melakarta #72 (Rasika-priya)



Etude in Melakarta #72 (Rasika-priya)



Classical Guitar Etudes using Melakarta Scales

The etudes in this section are for intermediate to advanced level performers.

Expression markings are limited in order to allow the performer freedom of interpretation. Fingering guidance has been provided.

The scale formula (scale signature) for each etude is provided at the top of the score in both Standard Scale Degrees and Adjusted Scale Degrees where applicable.

Since the guitar etudes are transcriptions of the piano etudes originally written in the key of C, they may have a different key signature basis other than C. The first note of the scale formula represents the key signature of the guitar etude.

Play the scale a few times to familiarize yourself with the scale signature. Read the score as you would read any Western classical music score, bearing the scale signature in mind.

Each etude is sure to take you to a novel, fresh sounding musical landscape!

Scale Formula	1	♭2	2	4	5	♭6	6
Tonic = A	A	B♭	B	D	E	F	F♯

or

1	♭2	♭♭3	4	5	♭6	♭♭7
A	B♭	C♭	D	E	F	G♭

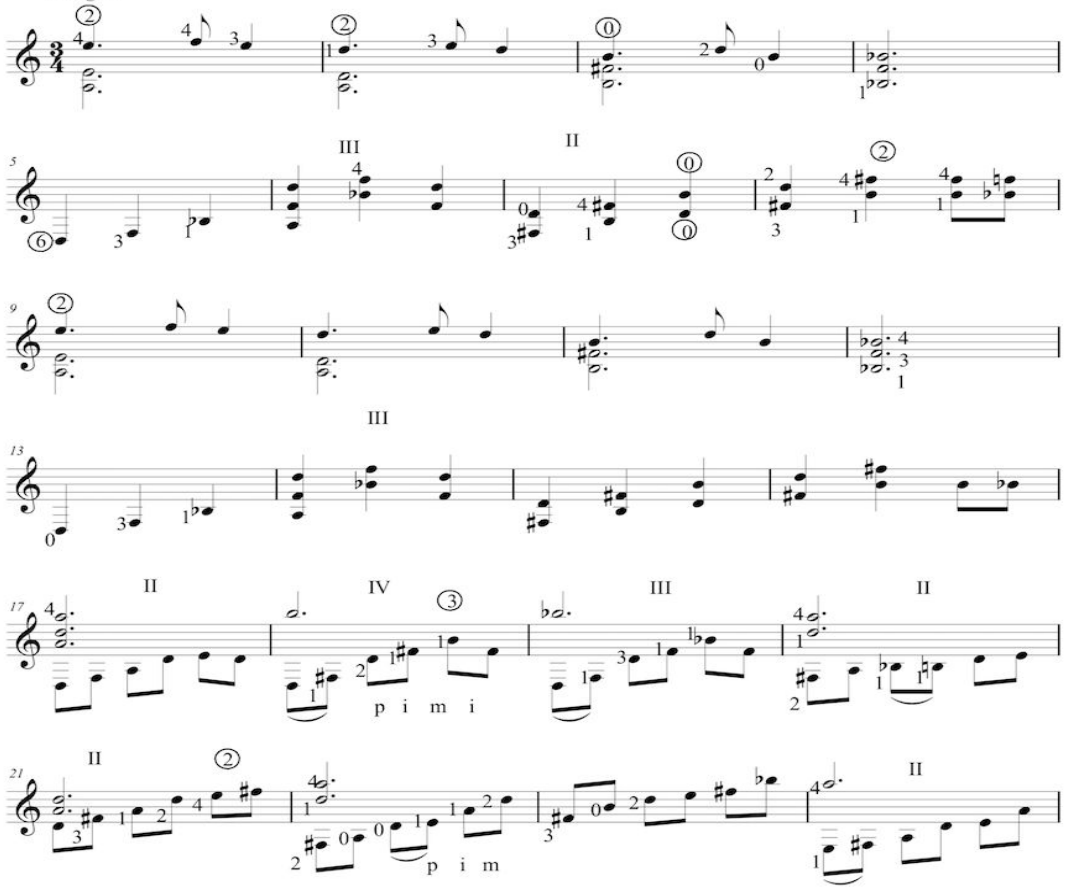
Etude in Melakarta #1 (Kana-kAngi)

13

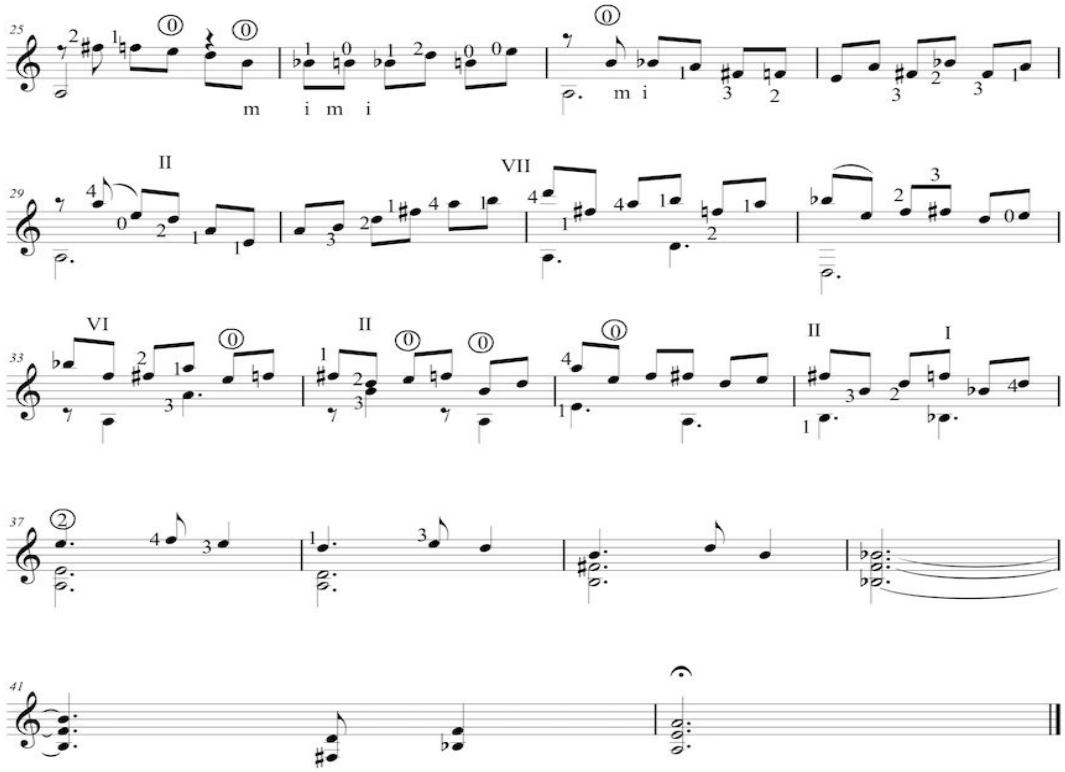
Composed by Radhika Iyer
Arranged for Classical Guitar by Matt Bacon

⑥ = D

Allegro



Etude in Melakarta #1 (Kana-kAngi)



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Scale Formula	1	♭2	♭3	4	5	6	♭7
Tonic = C	C	D♭	E♭	F	G	A	B♭

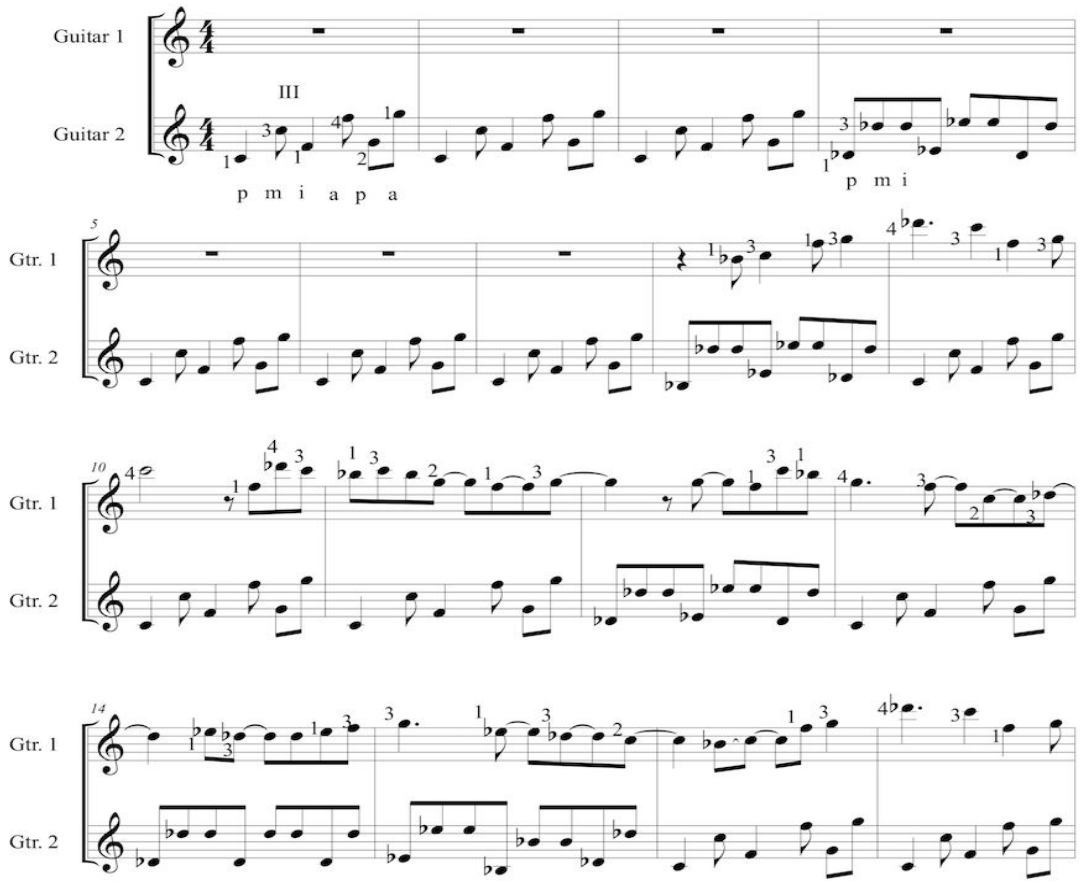
Etude in Melakarta #10 (NAtaka-priya)

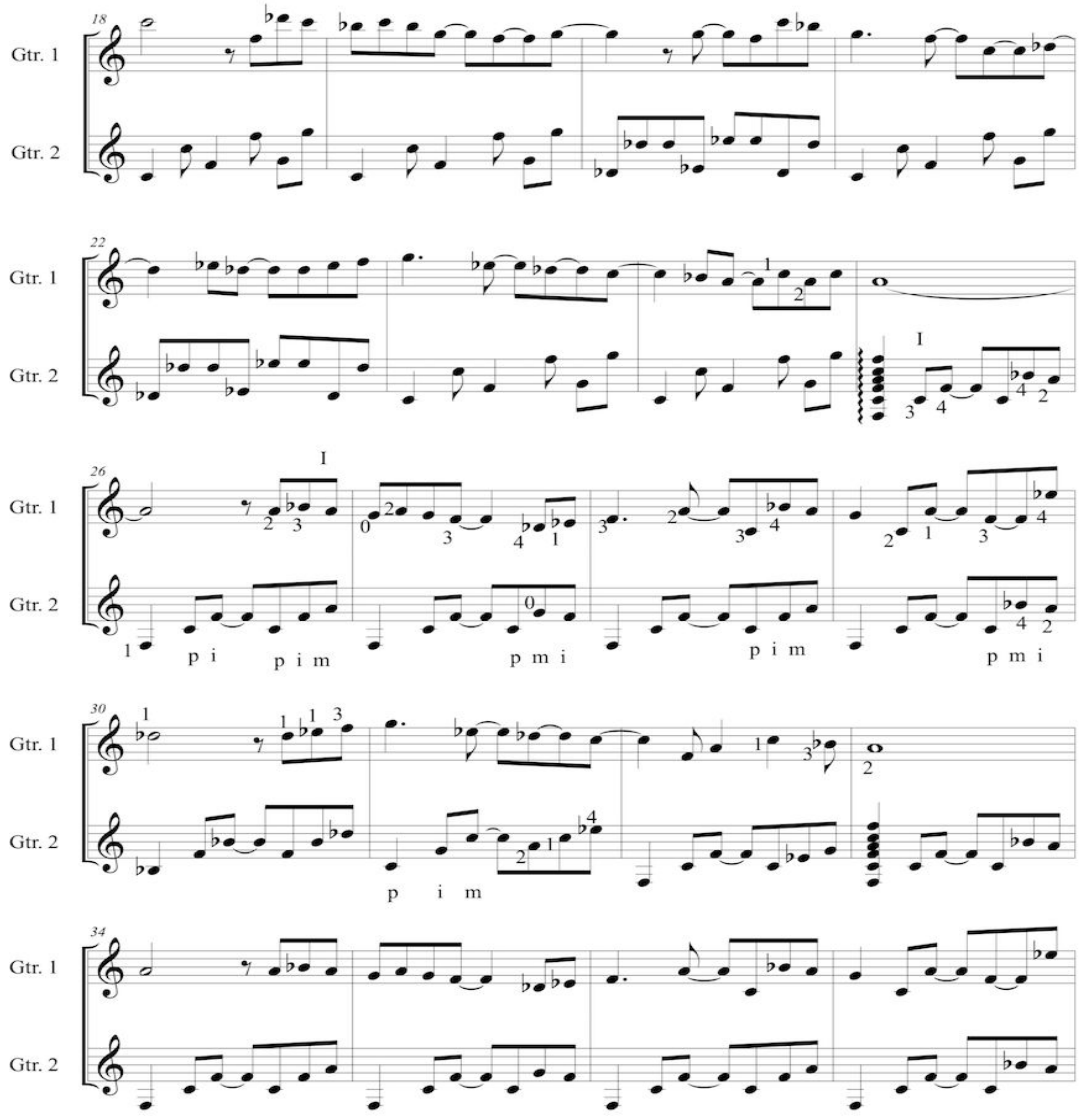
Composed by Radhika Iyer

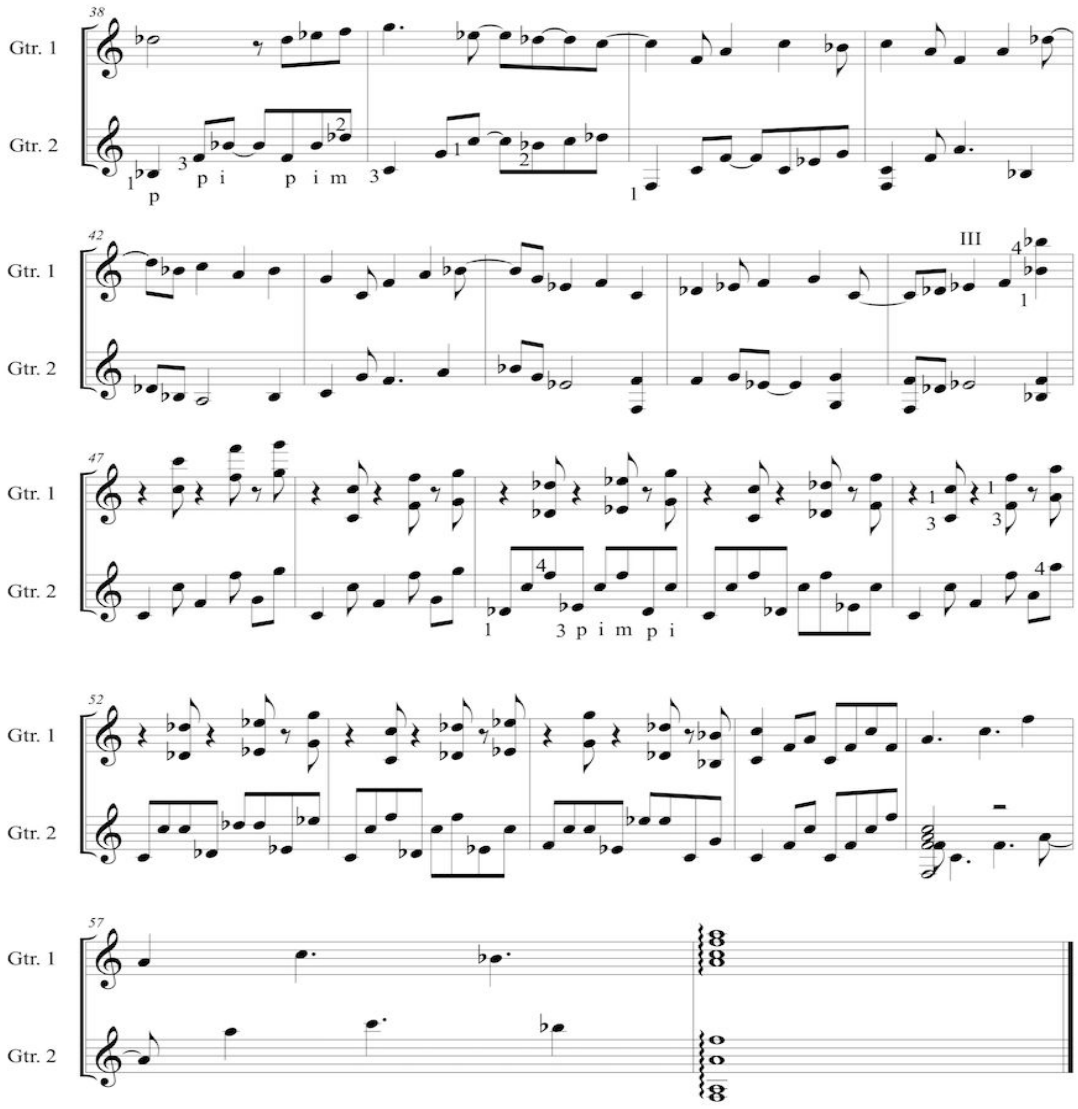
Arranged for Classical guitar by Matt Bacon

Guitar 2 Capo I (optional)

Allegro - Moderato (♩ = 140-160)




18
Gtr. 1
Gtr. 2
22
Gtr. 1
Gtr. 2
26
Gtr. 1
Gtr. 2
p i
p i m
p m i
p i m
p m i
30
Gtr. 1
Gtr. 2
p i m
34
Gtr. 1
Gtr. 2


38
Gtr. 1
Gtr. 2
p i p i m
42
III
47
3 p i m p i
52
57

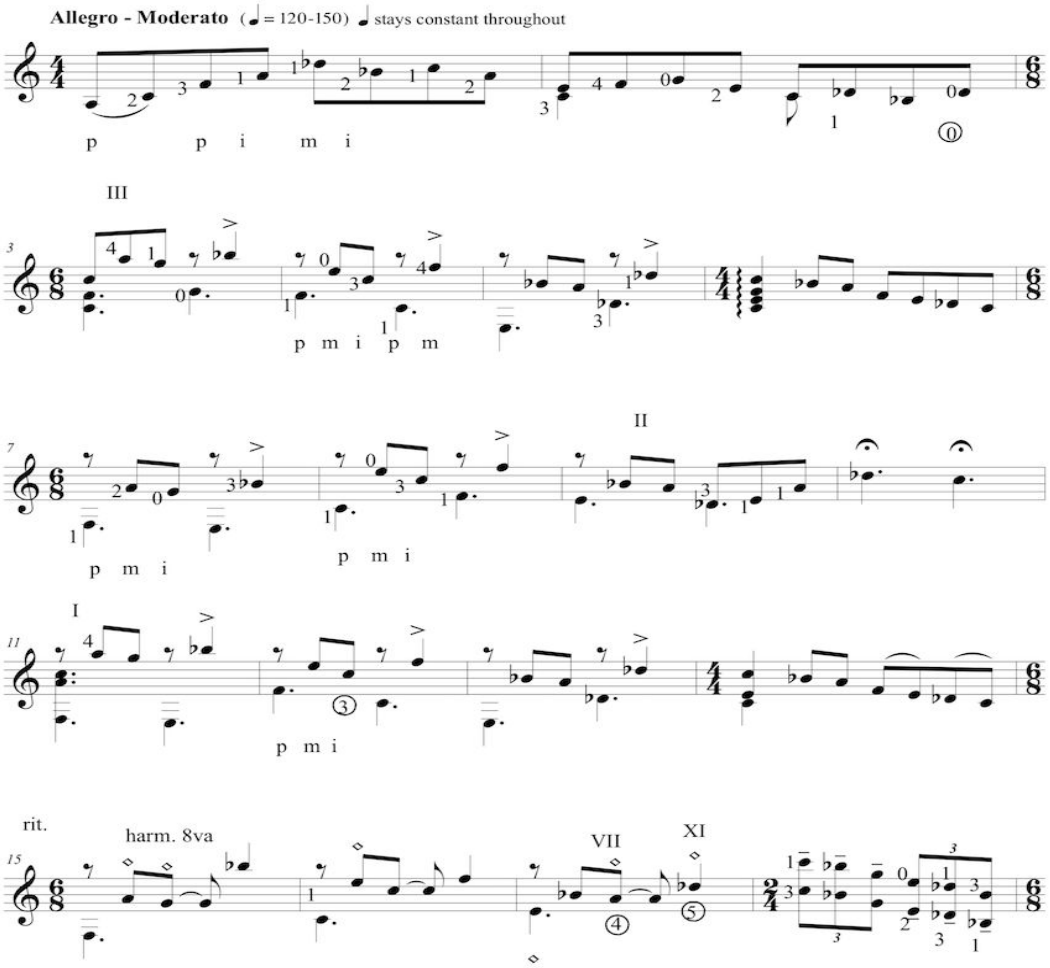
Scale Formula	1	♭2	3	4	5	6	♭7
Tonic = C	C	D♭	E	F	G	A	B♭

Etude in Melakarta #16 (Chakra-vAkam)

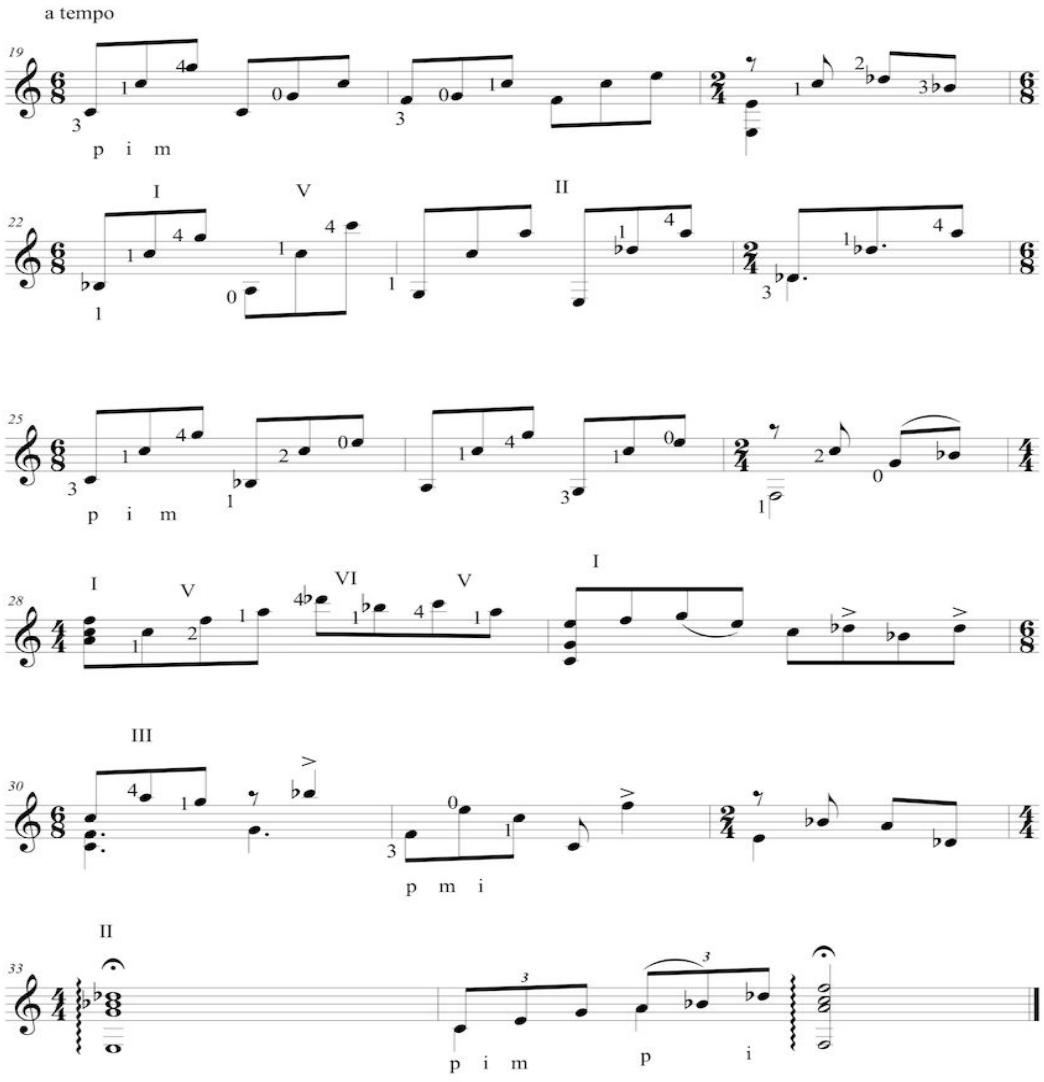
15

Composed by Radhika Iyer

Arranged for Classical Guitar by Matt Bacon



Etude in Melakarta #16 (Chakra-vAkam)



Scale Formula	1	2	♭3	4	5	♭6	6
Tonic = D	D	E	F	G	A	B♭	B

or

1	2	♭3	4	5	♭6	♭♭7
D	E	F	G	A	B♭	C♭

Etude in Melakarta #19 (JhankAra-dhwani)

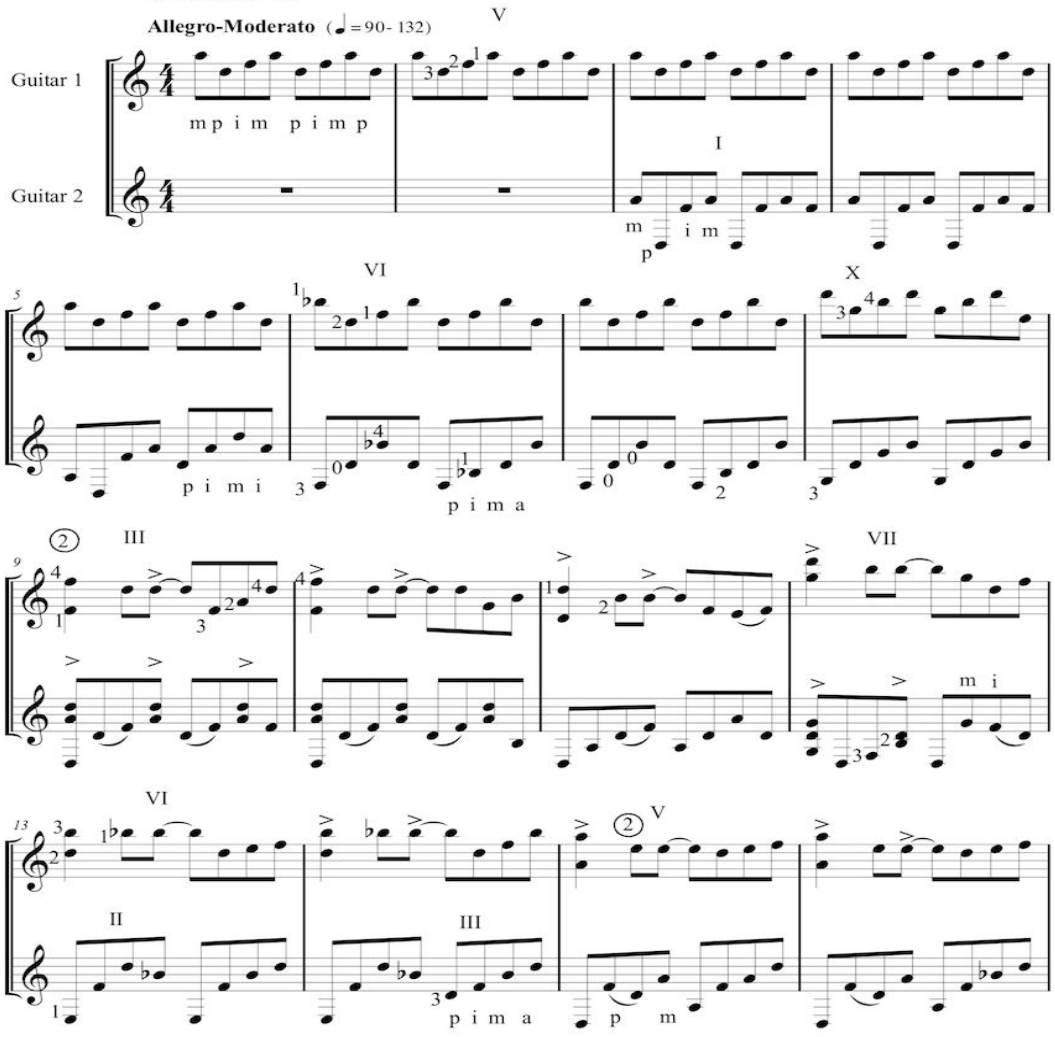
16

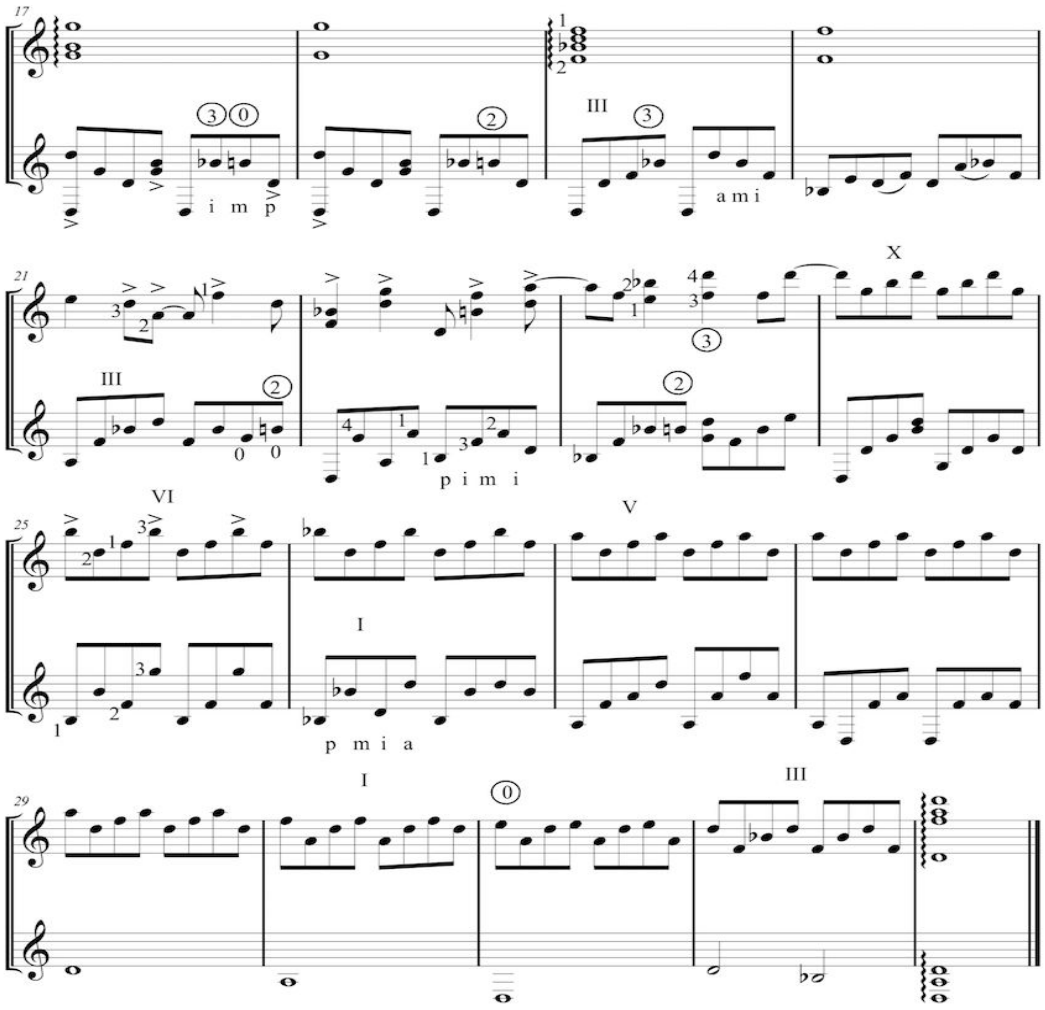
Composed by Radhika Iyer

Arranged for Classical Guitar by Matt Bacon

Guitar 2 6th = D

Allegro-Moderato (♩= 90- 132)




17
i m p
III
a m i
21
III
p i m i
X
25
VI
p m i a
I
V
29
I
III

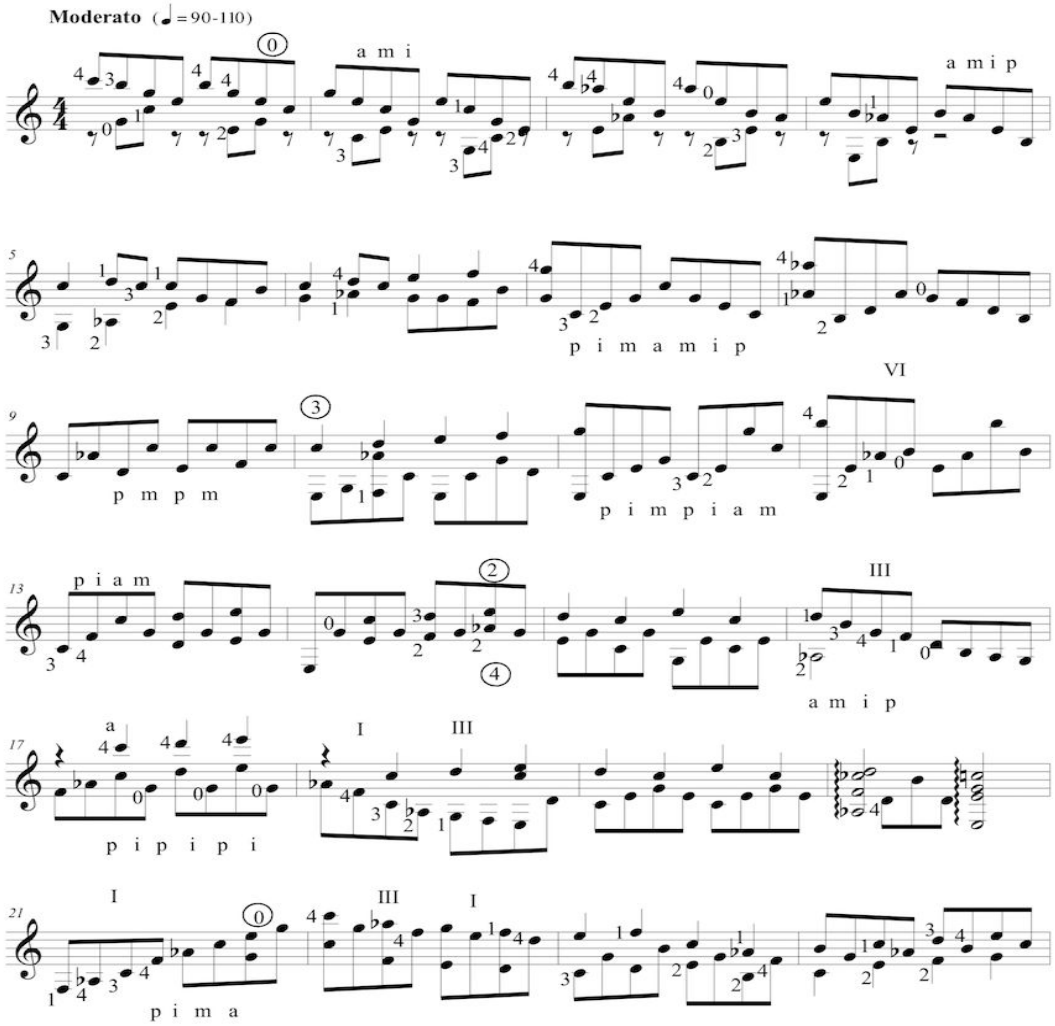
Scale Formula	1	2	3	4	5	♭6	7
Tonic = C	C	D	E	F	G	A♭	B

Etude in Melakarta #27 (Sara-sAngi)

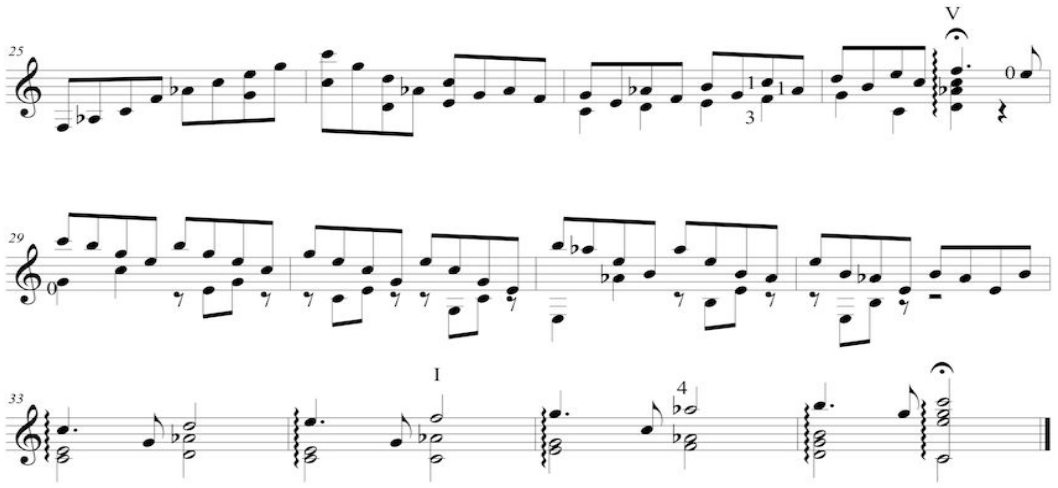
17

Composed by Radhika Iyer

Arranged for Classical Guitar by Matt Bacon



Etude in Melakarta #27 (Sara-sAngi)



Scale Formula	1	♭3	3	4	5	♭7	7
Tonic = D	D	F	F♯	G	A	C	C♯

or

1	♯2	3	4	5	♯6	7
D	E♯	F♯	G	A	B♯	C♯

Etude in Melakarta #36 (Chala-nAta)

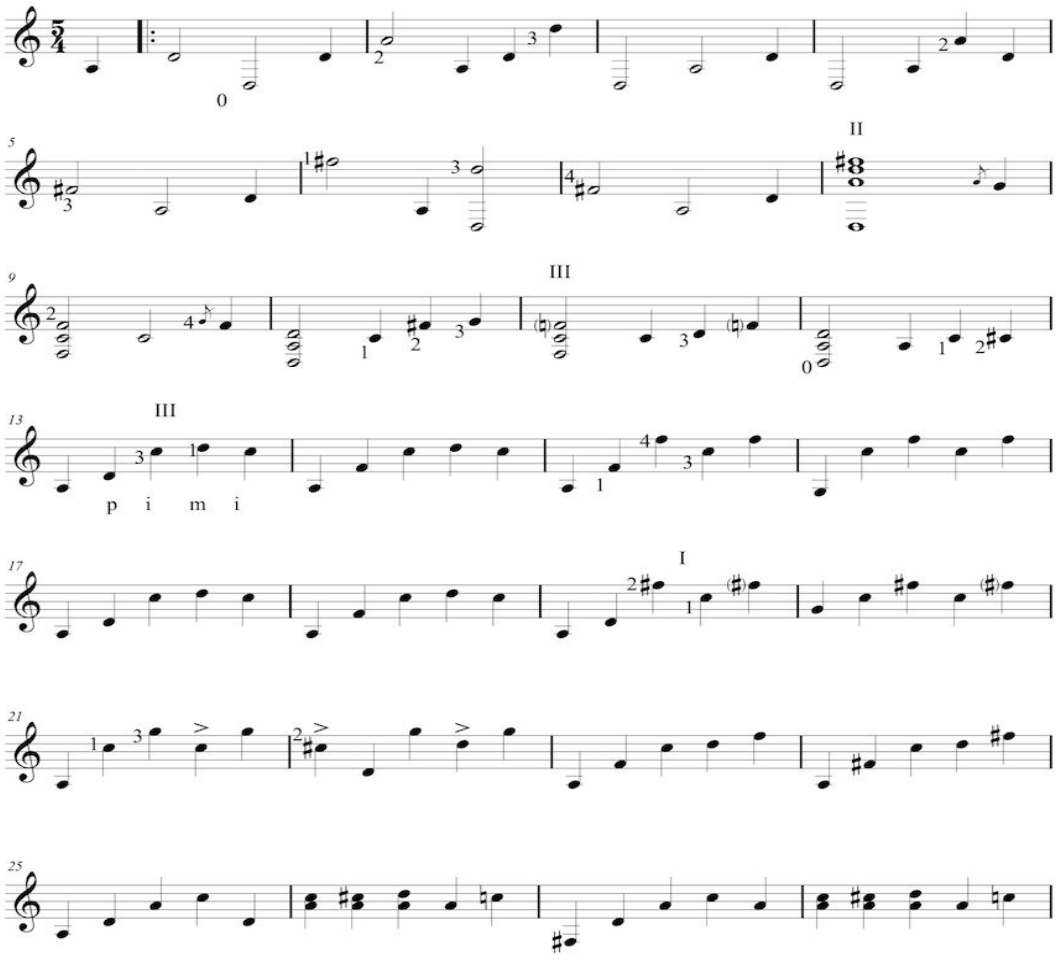
18

Composed by Radhika Iyer

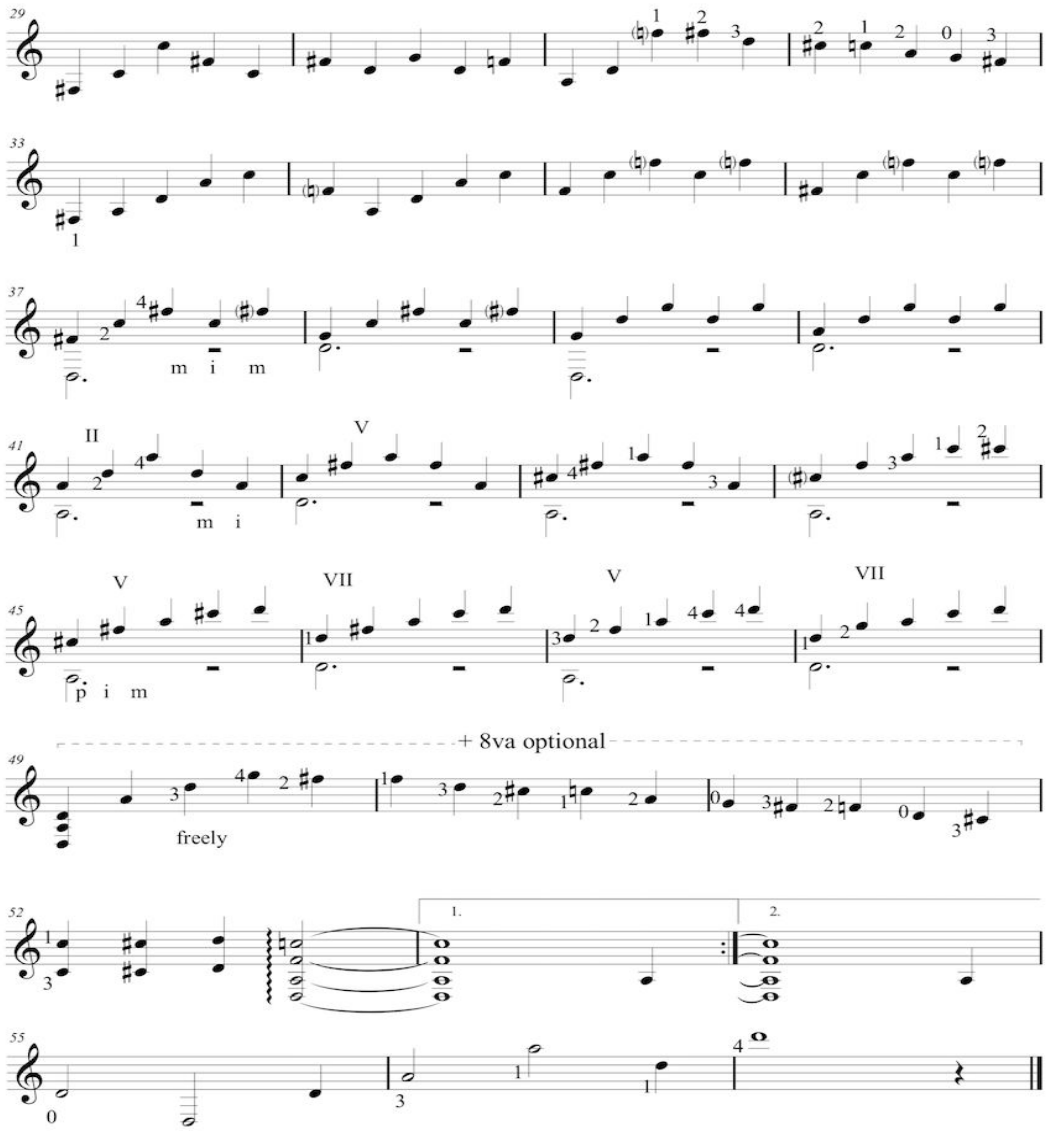
Arranged for Classical Guitar by Matt Bacon

6 = D

Vivace (♩ = 195-215)



Etude in Melakarta #36 (Chala-nAta)



Scale Formula	1	♭2	2	♯4	5	♭6	6
Tonic = C	C	D♭	D	F♯	G	A♭	A

or

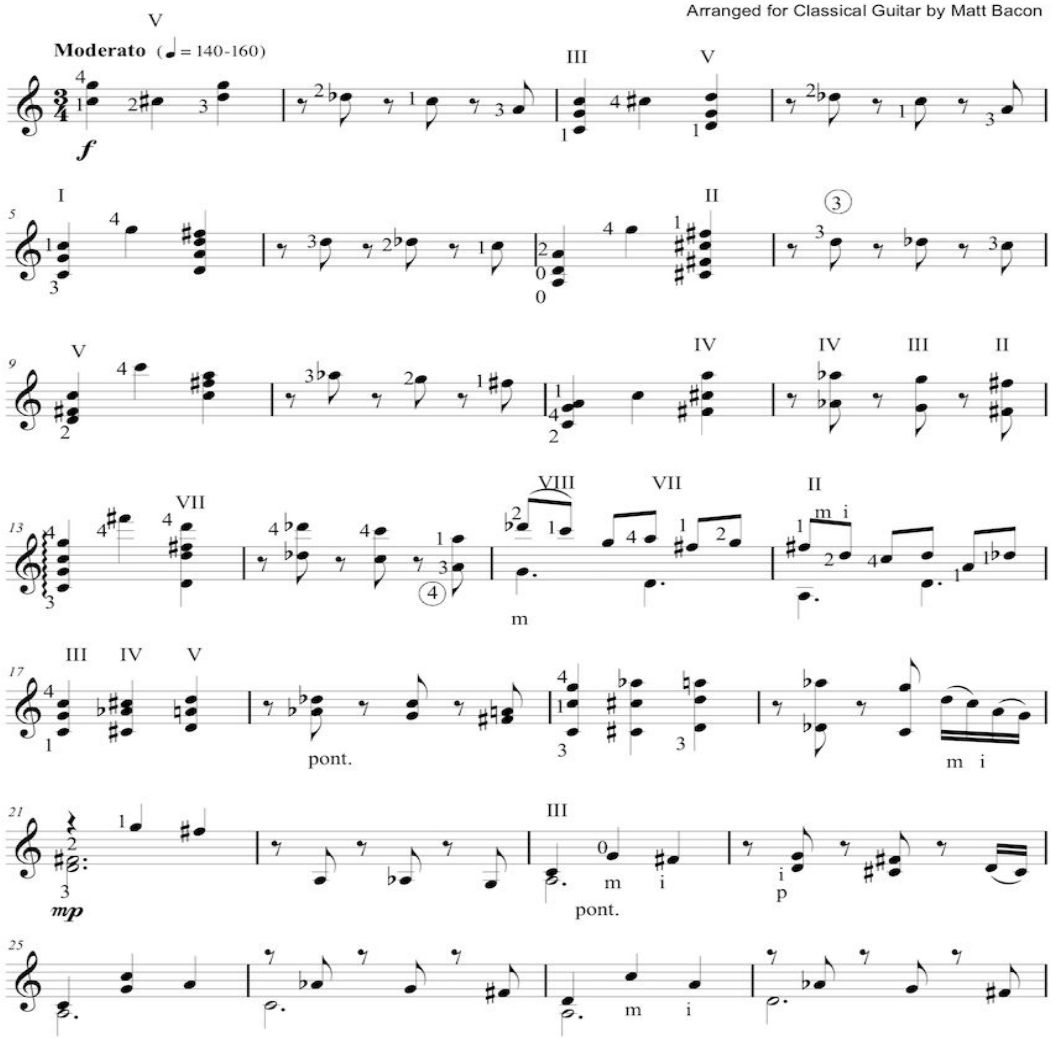
1	♭2	♭♭3	♯4	5	♭6	♭♭7
C	D♭	E♭♭	F♯	G	A♭	B♭♭

Etude in Melakarta #37 (SAlagam)

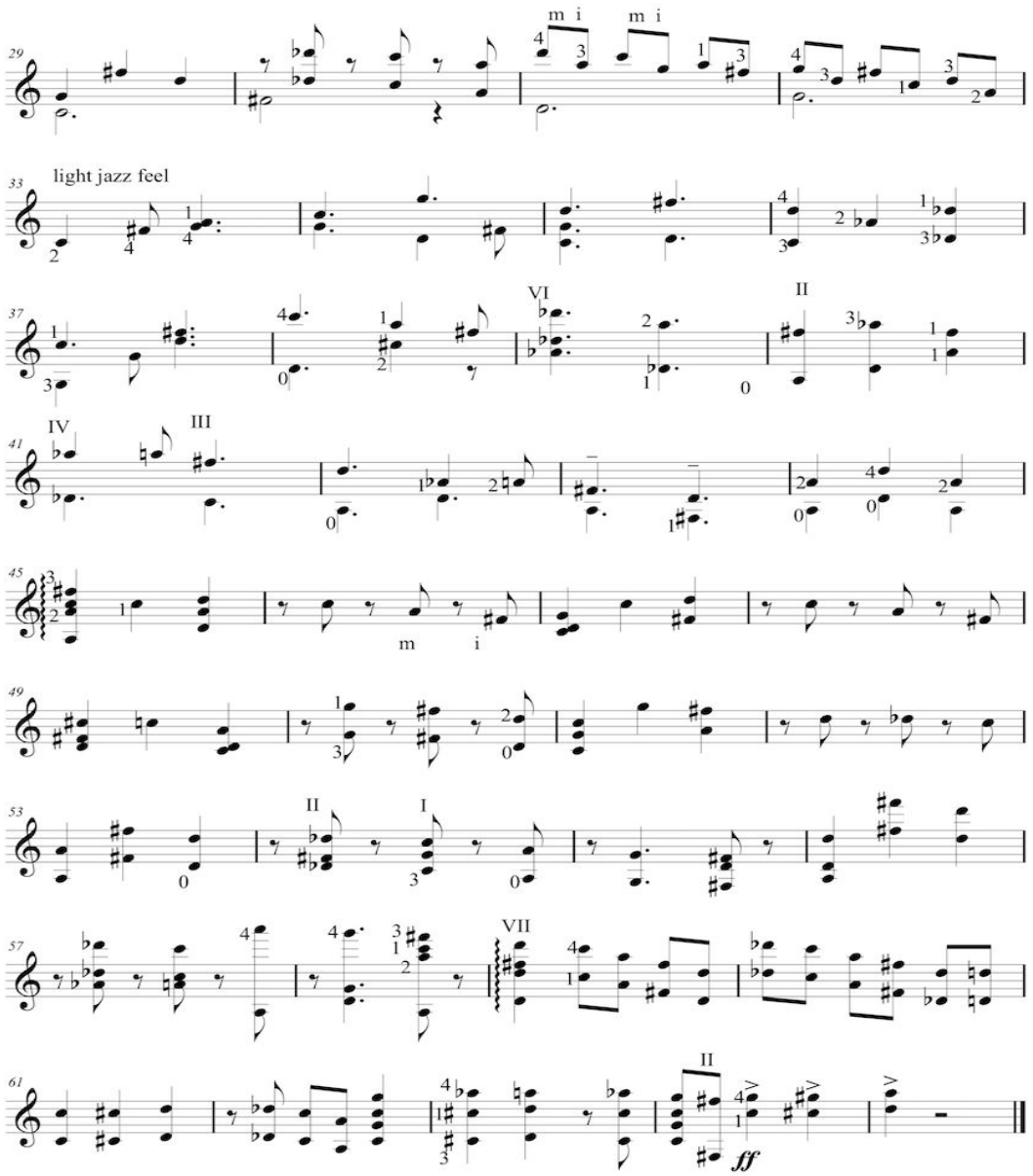
19

Composed by Radhika Iyer

Arranged for Classical Guitar by Matt Bacon



Etude in Melakarta #37 (SAlagam)

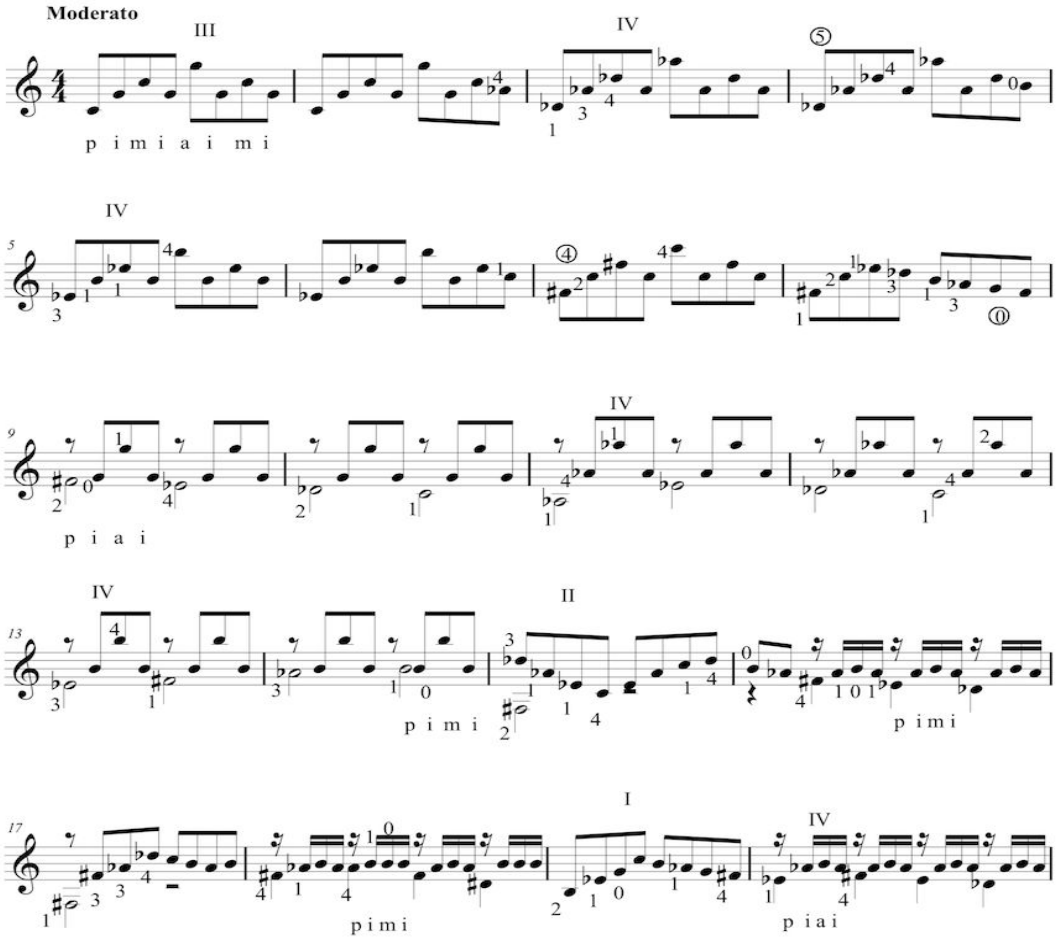


Scale Formula	1	♭2	♭3	♯4	5	♭6	7
Tonic = C	C	D♭	E♭	F♯	G	A♭	B

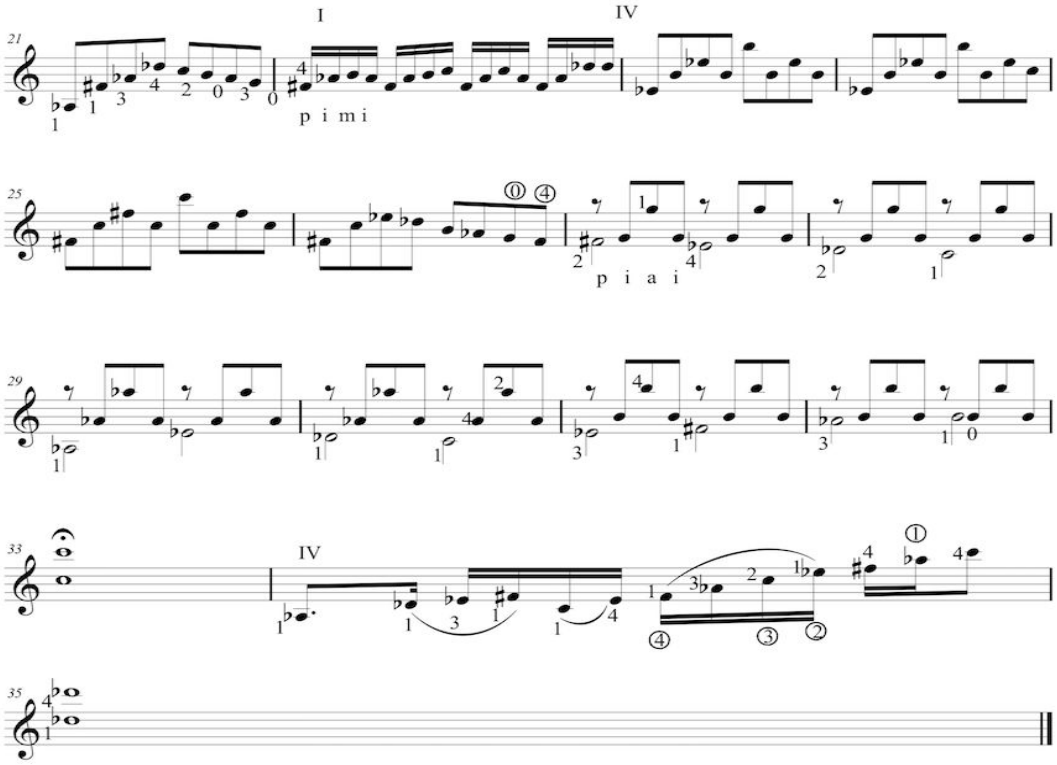
Etude in Melakarta #45 (Shuba-panthu-varAli)

Composed by Radhika Iyer

Arranged for Classical Guitar by Matt Bacon



Etude in Melakarta #45 (Shuba-panthu-varAli)



Scale Formula	1	♭2	3	♯4	5	♭6	7
Tonic = C	C	D♭	E	F♯	G	A♭	B

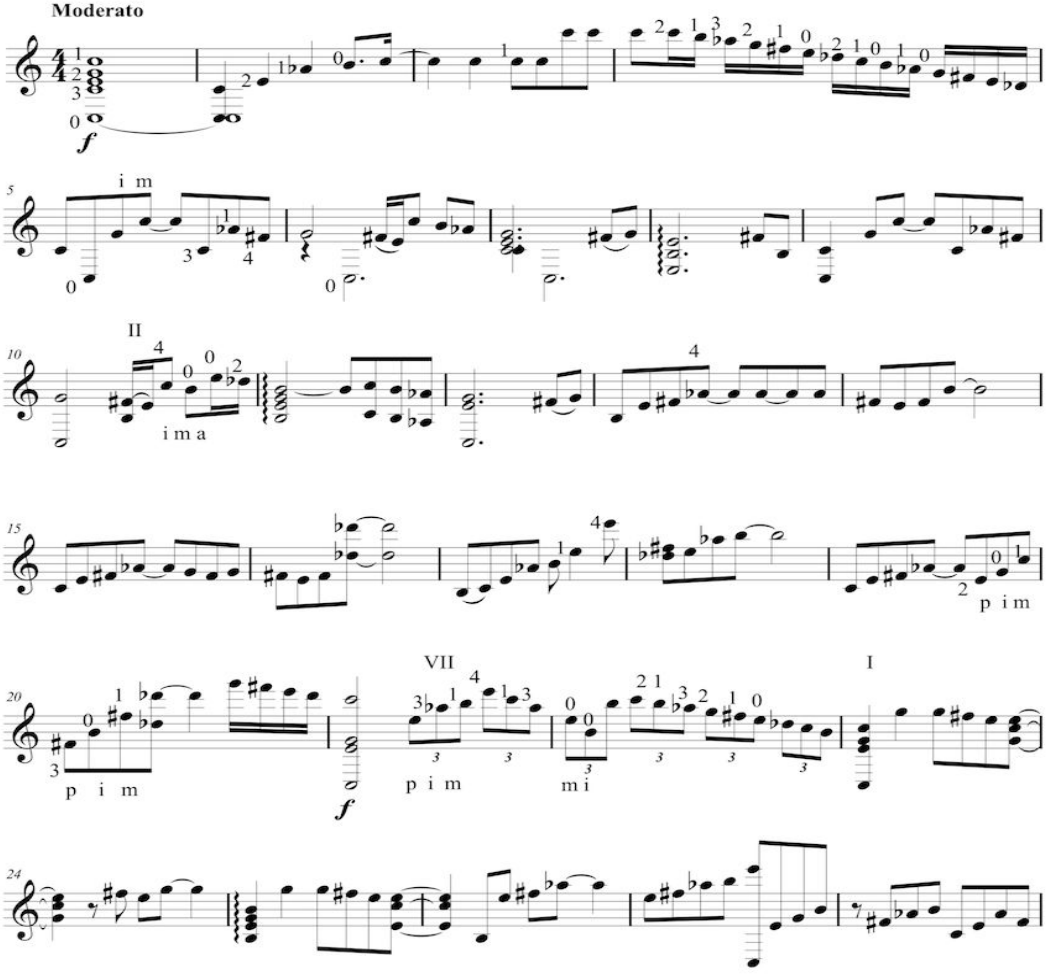
Etude in Melakarta #51 (KAma-vardhini)

Composed by Radhika Iyer

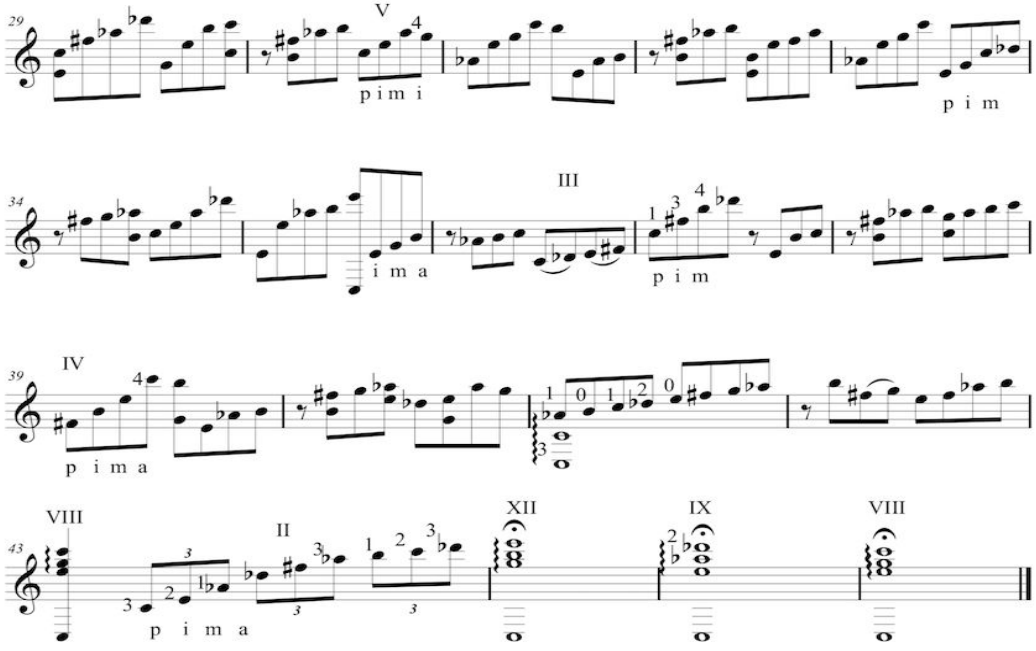
Arranged for Classical Guitar by Matt Bacon

6 = low C

Moderato



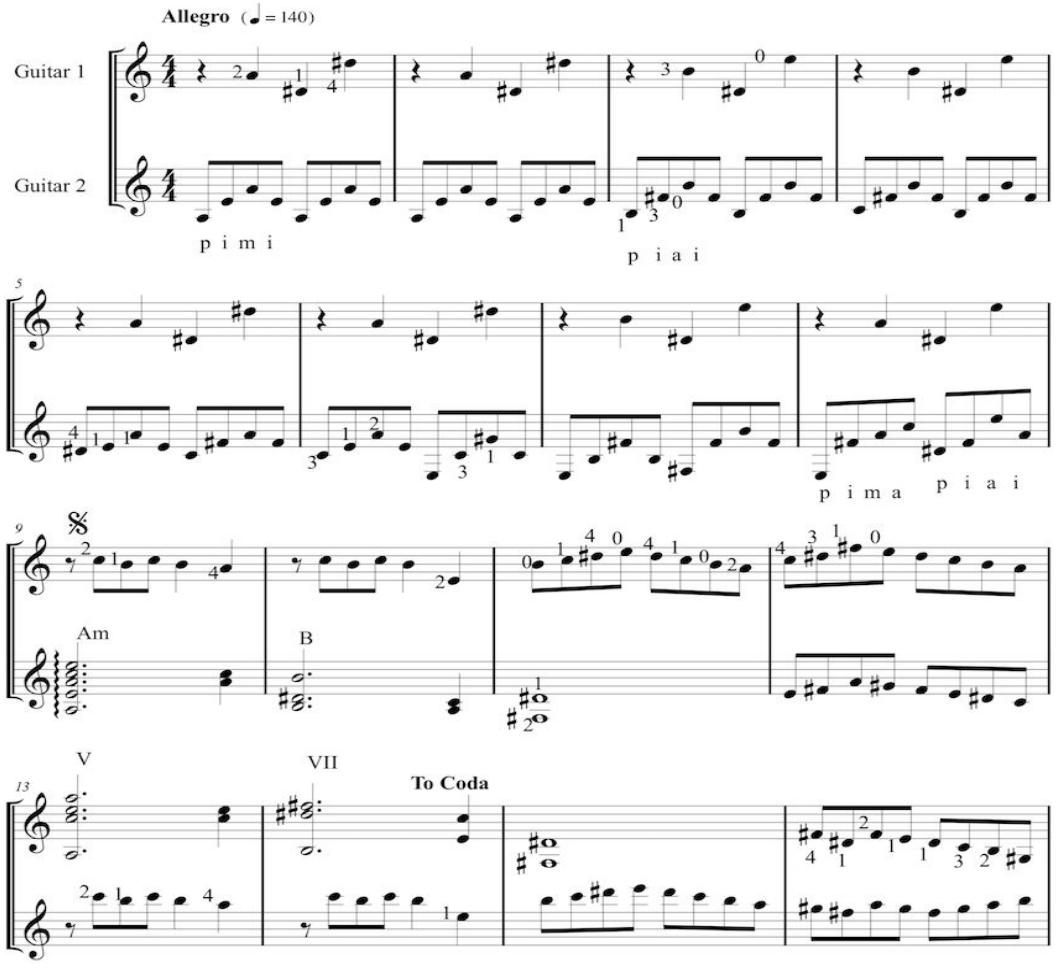
Etude in Melakarta #51 (KAma-vardhini)



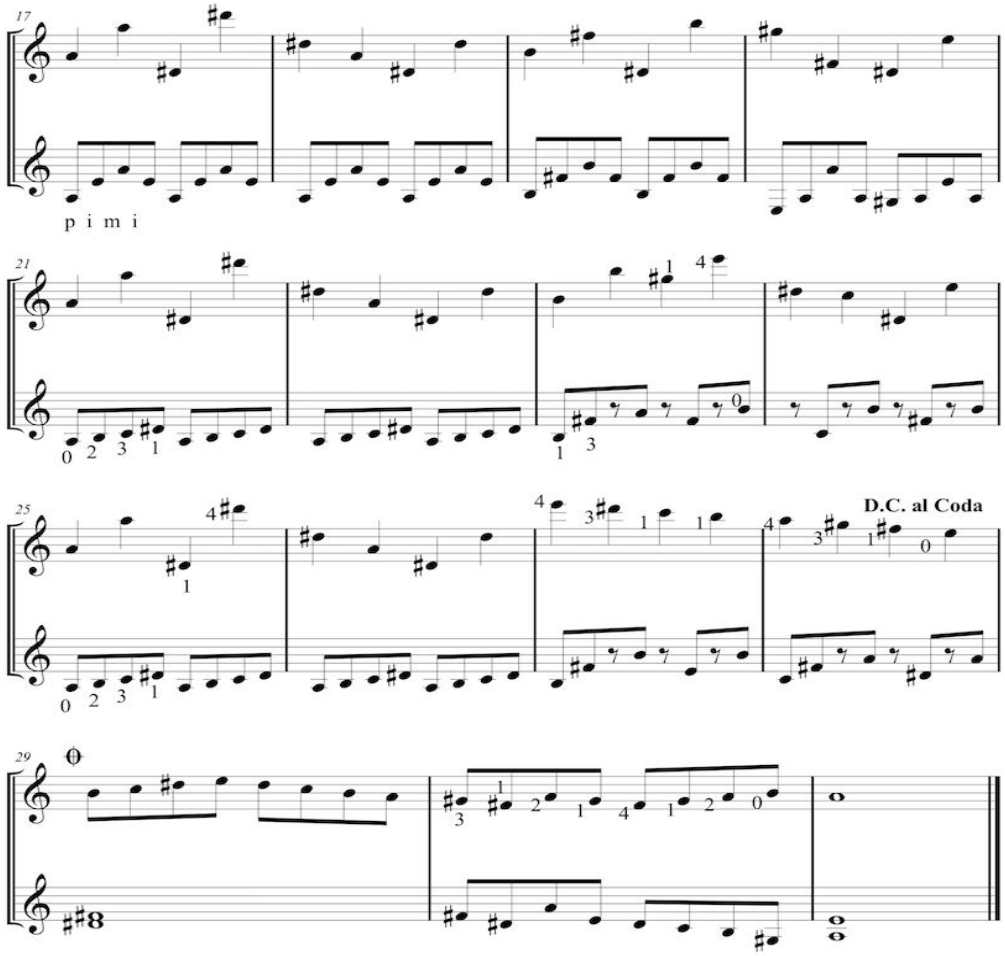
Scale Formula	1	2	♭3	♯4	5	6	7
Tonic = A	A	B	C	D♯	E	F♯	G♯

Etude in Melakarta #59 (Dharma-vathi)

Composed by Radhika Iyer
Arranged for Classical Guitar by Matt Bacon



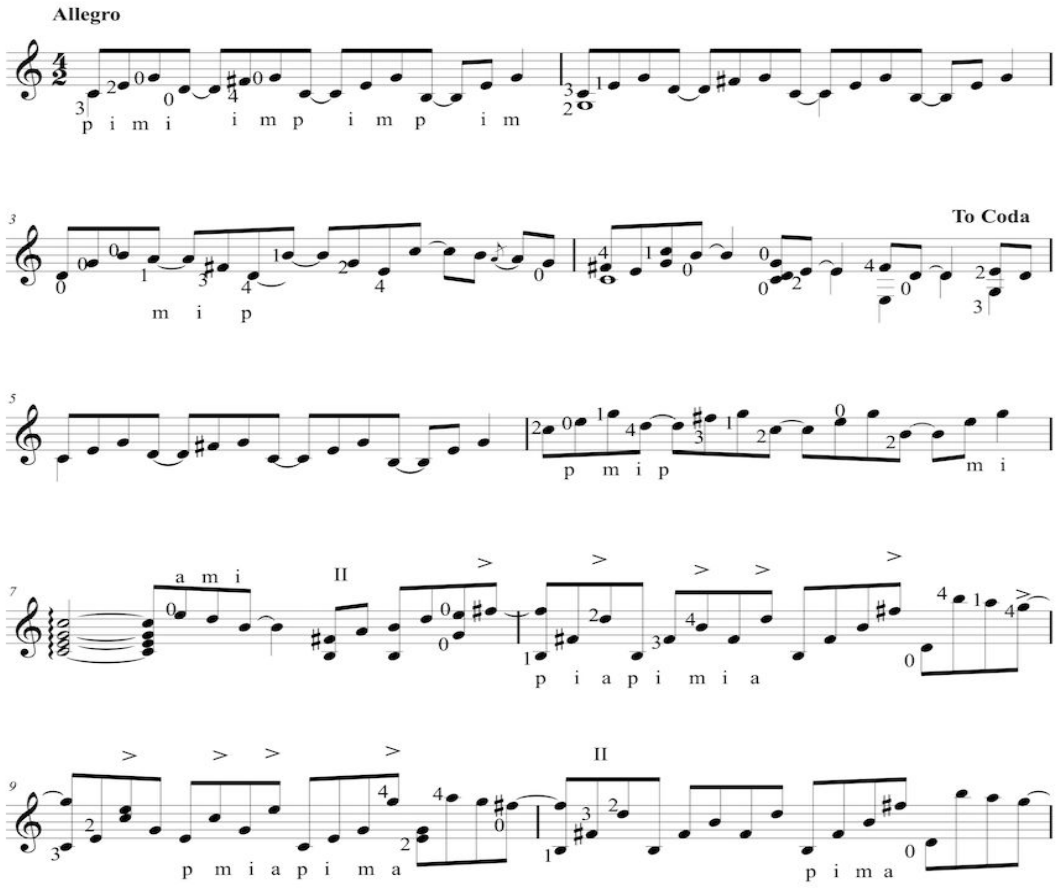
Etude in Melakarta #59 (Dharma-vathi)



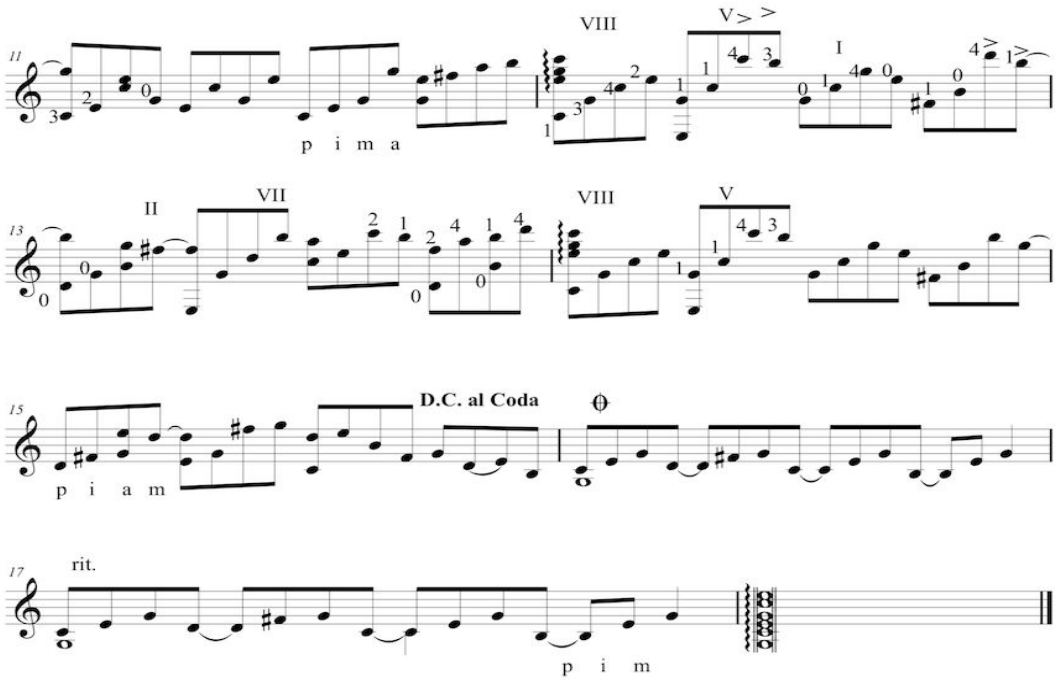
Scale Formula	1	2	3	♯4	5	6	7
Tonic = C	C	D	E	F♯	G	A	B

Etude in Melakarta #65 (Mecha-Kalyani)/(Lydian)

Composed by Radhika Iyer
Arranged for Classical Guitar by Matt Bacon



Etude in Melakarta #65 (Mecha-Kalyani) / (Lydian)



Scale Formula	1	♭3	3	♯4	5	♭7	7
Tonic = C	C	E♭	E	F♯	G	B♭	B

or

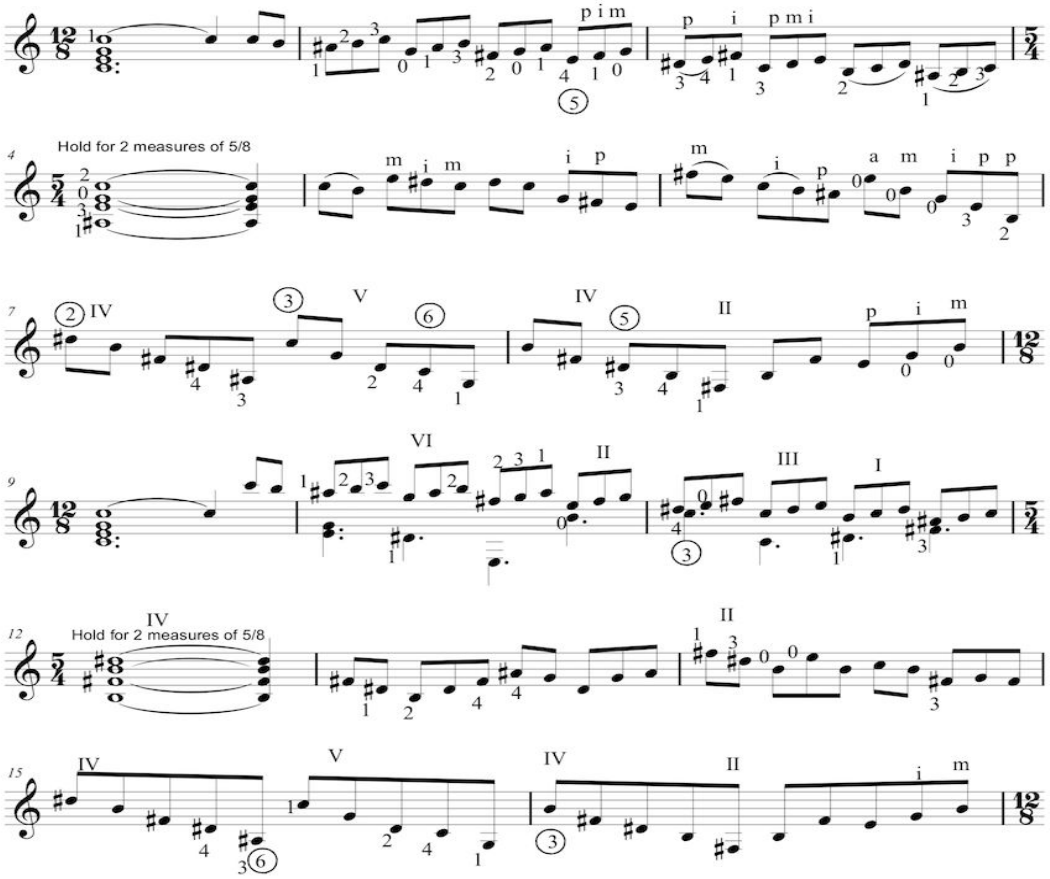
1	♯2	3	♯4	5	♯6	7
C	D♯	E	F♯	G	A♯	B

Etude in Melakarta #72 (Rasika-priya)

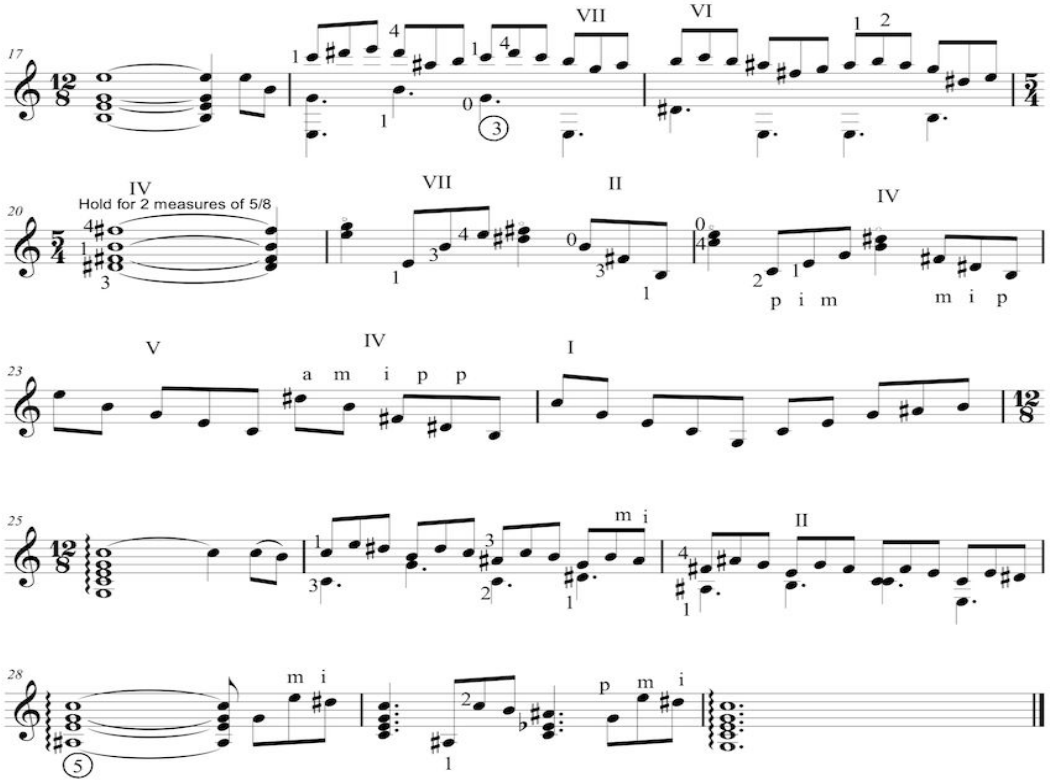
Composed by Radhika Iyer
Arranged for Classical Guitar by Matt Bacon

** Note : Time signatures 12/8 and 5/4

Moderato (♩. = 100-120) 𝅘𝅥𝅯 stays constant throughout



Etude in Melakarta #72 (Rasika-priya)



About the Author

RADHIKA IYER is an Indian author, violinist, songwriter, session musician and record producer. She writes and produces music released as solo productions under her name and also records for other producers.

Radhika is a proponent of both **Indian classical** and Western contemporary styles. With an established Indian classical music background, her solo productions exude an extraordinary reification of new aesthetic standards.

Her solo album *The Voyage* demonstrates her contemporized approach to progressive music where she elegantly combines eclectic Indian scales and exemplary articulations in her compositions which reveal her musical aptitude for blending Indian elements with Western genres in ways that are subtle, yet fascinating and novel.

Mr. William Bay of Mel Bay Publications Inc. said of this album – "Radhika Iyer is an extraordinary musician. Her work on the electric 7-string violin is captivating and worthy of the 'virtuoso' designation. Her compositions draw richly from Western and Eastern musical styles while adding her own unique contemporary touch. Radhika's CD is a ground-breaking and remarkable listening experience. I recommend it highly."

Radhika has received several Indian Government scholarships for her music from India, and is also a recording artist with *All India Radio* (A.I.R); the most highly esteemed broadcaster of classical music in India. Deeply inspired by Western classical and world genres, Radhika felt an innate need to expand her stylistic boundaries by pioneering alternative musical routes which allowed her to adapt to Western styles alongside Indian classical.

Today, Radhika plays a custom 7-string fretted electric violin tuned to Western standard tuning, and has completely revolutionized the art of playing Indian classical music on it – switching seamlessly between Indian classical, Western classical and contemporary fusion styles. Radhika's expertise has been acclaimed as highly advanced and ground-breaking by recording artist, Emmy-winning composer and violinist Mark Wood, who designed Radhika's violin, and believes that such revolutionary work in the field of string playing is unprecedented.

In an industry where originality is prized, Radhika wants to leave a legacy for generations to come. To her, the vision is clear; she sees a future where music from the West and music from India can interact perfectly and co-exist as one unified musical entity. Radhika also wants to mentor Western string players who desire to learn Indian classical music techniques, or take them up as a major, in addition to mentoring Indian violinists who want to learn Western classical techniques in parallel.

This book is the first of a larger body of work Radhika will be authoring in the future. Her subsequent books will continue to analyze basic and advanced harmony in the Indian melodic system, and musical works for Western instrumental players with an increased focus on orchestral and ethnomusicology studies.

Radhika can be contacted via her website www.radhikaiyer.com or emailed at mail@radhikaiyer.com