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# Time, sign, tension: a semiotic perspective on Beethoven's rhythmic construction in *Piano Sonata in E minor, op. 90*

Diana ICHIM[1], Renate FERENCZ[2], Stela DRĂGULIN[3]

***Abstract:*** *At the heart of the performing approach is the issue of rhythm as a vector of formal coherence, semantic tension, and expressiveness in Beethoven's piano sonatas. Classical phraseological structures arise from a rhetoric of continuity and becoming, where musical time is a dialectical process between metrical stability and transformative impulse. Through techniques like motivic shortening, progressive acceleration, sonic expansion, and metric reconfiguration, Beethoven redefines the relationship between expressiveness and sound structure, creating a language in which rhythm becomes the generative principle of form. From a semiotic and aesthetic perspective, Beethoven's beats goes beyond the technical dimension, becoming a signifier of will, inner tension, and temporal drama. An analysis of the Sonata in E minor, Op. 90, shows the fragile balance between the tragic force of the first movement and the contemplative lyricism of the second movement, expressing an inner temporality between discourse and revelation. In this conception, rhythm is not only a structural phenomenon but also a metaphysical principle of expressive unity in Beethoven's sonatas.*

Key-words: *Beethoven, piano sonata, time, sign, tension, rhythm*

## 1. Introduction

In Viennese classical music, rhythm is not only an organizational dimension of musical discourse, but also a fundamental expressive and semiotic category, capable of structuring the internal time of form. In Ludwig van Beethoven's piano sonata, this dimension reaches unprecedented depth: rhythm becomes the instrument through which the dialectical tension between formal rationality and affective expressiveness, between classical order and emerging romantic energy, is

[1] Transilvania University of Brașov, diana.ichim@unitbv.ro
[2] Transilvania University of Brașov, renate.ferencz@student.unitbv.ro
[3] Transilvania University of Brașov, dragulin@unitbv.ro

articulated. Beyond its metrical function, rhythm in the piano sonatas constitutes a sign of will, of the inner movement of sound consciousness, and of the temporal drama that defines Beethoven's aesthetics.

Placing rhythm at the center of analysis requires a dual approach: structural and semiotic. Rhythm acts as an architectural principle, governing phrase construction, proportional relationships between motifs, and formal development. It also becomes a bearer of meaning, signifying vital energy and the dialectical process that animates the sonata. The theoretical tradition of the 18th century, represented by Kirnberger, Koch, and later Schenker, provides a framework for understanding how Beethoven reinterprets the logic of the classical phrase. The overlapping of phrases, metric reinterpretation, and harmonic cadences, treated by theorists of the time as articulation techniques, are reconfigured by Beethoven into a discourse of tension and continuous transformation.

Compared to his predecessors Haydn and Mozart, Beethoven achieves an essential change: rhythm is no longer a consequence of the phrase but becomes its generator. The process of motif shortening and the progressive acceleration are, in many of his sonatas, mechanisms for constructing form. This internal beat creates a sense of inevitability, a movement toward climaxes that transcends meter and becomes expressive energy. In this dynamic, the temporal dimension assumes a semantic function, contributing to the articulation of musical meaning.

Such a vision of rhythm calls for a reading that goes beyond formalist analysis. From an aesthetic and semiotic perspective, Beethoven's rhythm can be understood as a manifestation of creative will—what Adorno would call “form as process” (Adorno 1993, 49-52) and Tarasti would interpret as “symbolic narrative of becoming.” (Tarasti 1994, 73) In his sonatas, musical time is not only measured but also experienced: it pulsates, contracts, and expands, expressing in sound terms the tension between consciousness and matter, between the ideal and the concrete.

In particular, the Sonata in E minor, Op. 90 is a revealing example of this thinking. Its two parts reflect the opposition between inner drama and lyrical reconciliation, between tragic impulse and the balance of meditation. In the first part, the dotted rhythm and fragmentary motifs express turmoil and conflict; in the second part, the smooth beat, continuous phrasing, and symmetry of proportions suggest a pacification of discourse, a transfigured temporality. This relationship between movement and rest, between tension and resolution, defines Beethoven's mature aesthetic, in which contrast is no longer merely formal, but existential.

Thus, the analysis of rhythm in Beethoven's sonatas necessarily involves a reflection on the nature of musical time and its symbolic significance. From this perspective, rhythm becomes a medium of revelation—a form of thought that

transforms succession into meaning, proportion into discourse, and structure into expression.

## 2. The rhythm and the structure of the Classical phrase

Understanding Beethoven's thematic invention requires a close examination of Classical phrasing — a principle that unites structural syntax, metrical grouping, and expressive articulation. In eighteenth-century theory, phrasing was conceived as a direct analogue to the grammar of speech, an idea clearly expressed by Johann Philipp Kirnberger in *Die Kunst des reinen Satzes in der Musik* (Kirnberger 1982, 114): "Just as a paragraph in language consists of clauses and sentences marked by commas, semicolons, and periods, so too a musical paragraph may consist of several segments, phrases, and periods". Such a conception situates musical syntax within a rhetorical and linguistic continuum, in which punctuation and cadence embody the logic of articulation and repose.

At the core of Classical syntax lies the *parallel period*, the fundamental two-phrase structure comprising an antecedent that concludes with a half cadence and a consequent that mirrors the opening but achieves a full cadence. This archetype underpins countless Classical themes, where the full cadence resolves the harmonic and melodic tension previously suspended. Carl Czerny, a direct pupil of Beethoven, observed this principle in his teacher's *Piano Sonata in C Major, Op. 53* ("Waldstein"), describing the chorale-like middle theme in E Major as a model of simplicity derived from the diatonic scale, yet expanded through organic rhythmic vitality (Bent 1994, 104).

Within this syntactic framework, Beethoven's phrasing reveals a deep concern with continuity and transformation. He often employs *motivic shortening,* which is a process of contraction that intensifies the rhythmic momentum. This process allows ideas to evolve naturally rather than appear juxtaposed. His lines frequently unfold as if taken in a single breath, suggesting an underlying vocal or instrumental continuity that transcends surface segmentation. The effect is a near-uninterrupted flow, achieved not through mechanical regularity but through the subtle dovetailing of subphrases.

One of Beethoven's characteristic techniques is the *overlapping of phrases*, whereby the final note or chord of one phrase simultaneously initiates the next. This overlap generates what eighteenth-century theorist Heinrich Christoph Koch termed "metric reinterpretation," a moment in which one bar serves a dual syntactic function, both as the closing measure of the preceding phrase and as the

opening of the subsequent one. (Koch 1983, 54-55) Such reinterpretation blurs metrical boundaries, “smothering” the bar line and producing an effect of seamless continuity.

Equally important are Beethoven’s methods of *phrase extension*, which he shares with Haydn and Mozart but applies with greater expressive intensity. Internal extension may occur through repetition of a motivic cell, through prolongation of a harmonic or melodic tone, or through the insertion of an expanded suffix that amplifies the phrase’s expressive trajectory. Heinrich Schenker later described this process as “fermata-like,” emphasizing how such prolongations suspend motion while maintaining forward drive — a temporal paradox that lies at the heart of Beethoven’s phrasing.

Cadential ambiguity further reinforces continuity. Deceptive and weak cadences, contrapuntal imitation, and harmonic or voice-leading connections all serve to fuse formal units into larger spans of discourse.

Thus, Classical phrasing in Beethoven’s music embodies a delicate balance between symmetry and continuity. Phrase articulation is never merely mechanical but always charged with rhetorical and expressive purpose. The processes of overlapping, extension, contraction, and metric reinterpretation transform formal symmetry into living motion. In this sense, Beethoven inherits the Classical grammar of phrase and period yet redefines it as a vehicle for expressive transformation, a temporal logic in which the boundaries between articulation and continuity, punctuation and breath, become dynamically fluid.

## 3. Rhythmic continuity and proportional tempo relationships in Beethoven's sonatas

One of the most distinctive aspects of Beethoven's compositional thinking is the way in which rhythm becomes a structural principle, capable of generating not only formal coherence but also psychological continuity between the parts of a sonata. Whereas in Haydn or Mozart the tempo relationships between movements were based on conventional contrasts of character, in Beethoven we witness a radical transformation of the concept of “succession” into “metamorphosis”. Charles Rosen rightly pointed out that Beethoven “keeps the underlying pulse constant while changing its subdivisions”, (Rosen 2002, 31) thus creating what we might call a ***proportional tempo relationship***, a technique whereby each new movement or section derives its energy from a clear proportion to the previous one.

In Sonata Op. 53 “Waldstein”, for example, the ratio between the *Allegro con brio* of the first movement and the *Prestissimo* of the final coda is not arbitrary but

built on an almost quadruple proportion of the pulse. If the basic pulse of the first part is felt at around quarter note = 144, then the coda is organized around quarter note = 288, which amplifies the perception of acceleration without breaking the internal continuity of energy. Thus, the *Prestissimo* does not appear as a simple increase in speed, but as a natural culmination of a progressively accumulated tension. Beethoven does not "change" the tempo, but transforms it proportionally, maintaining the architectural coherence of the entire movement.

This concept already appears in Sonata Op. 2 No. 1, where the connection between the opening *Allegro* and the central *Adagio* consists not only in the emotional contrast, but also in a subtle rhythmic relationship: the eighth note pulse in the first part corresponds, in perception, to the sixteenth note pulse in the slow movement. This relationship ensures a "common breath" between the parts, even if the affect changes radically. Beethoven seems to create an organic unity between movements through an internal system of rhythmic proportions that does not depend on metrical notation, but on the perception of duration and sound density.

In his mature sonatas, proportional relationships are complicated by the introduction of indications such as *Poco più allegro*, *Più allegro*, or *Tempo di menuetto*, which imply not only a mechanical change in speed, but an expressive recalibration of the pulse. In Sonata Op. 31 No. 1, for example, the contrast between the initial *Allegretto* and the *Più allegro* passages is not one of absolute "speed," but of discursive intention. The *Allegretto*, which according to Mozartian tradition should be around quarter note = 76–80, is reinterpreted by Beethoven as an elastic movement, full of internal tension, while the *Più allegro* becomes a perceptible acceleration of the same pulse—an intensification of momentum, not a change of character. In this way, Beethoven substitutes the classical idea of contrast with a dialectic of transformation.

Another relevant example appears in Sonata op. 110, where the transition from *Arioso dolente* to Fuga: *Allegro, ma non troppo* is achieved through a subtle connection of pulse. If *Arioso dolente* breathes in an elastic *Andante*, with the main pulse at quarter note= 56–60, the entrance of the fugue retains the same “battement intérieur”, despite the *Allegro* marking: a sign that, beyond the differences in meter and figurativeness, the inner energy of the discourse remains unified. The proportional relationship between the final movements makes the entire sonata function as a meditation on rebirth—an organic continuation, not a rupture.

On a microstructural level, Beethoven uses the displacement of the metrical accent to create tension between the pulse and the phrase level. In Sonatas Op. 10 No. 3 and Op. 22, for example, the accents are deliberately shifted from the strong beats of the measure to the intermediate positions, generating an elasticity of

phrase rhythm that gives the discourse a sense of unpredictability. This type of "mobile accentuation" allows for a fluid transition from one thematic idea to another, avoiding artificial separations between sections and favoring a discursive continuity close to rhetorical language.

In the same vein, the *Scherzo* from Sonata Op. 26 illustrates what Rosen calls "the transformative character of phrasing": slurs and legatos indicate expressive intent rather than mechanical articulation. (Rosen 1997, 342) By displacing the accent and adding small extensions of duration at the end of phrases, Beethoven creates an illusion of acceleration or suspension, which serves to link the sections into a single flow.

## 3. Piano Sonata in E minor, op. 90

After expanding the piano sonata to unprecedented proportions, Beethoven was able, with the grace and confidence of his talent, to return to the more direct and succinct statements of form. The four sonatas (Nos. 24 to 27) show how creatively and flawlessly he could compose on a non-monumental level. With these compositions, he seems to be “taking a deep breath” in preparation for the monumental work of his last five sonatas, which were scheduled to be completed between 1816 and 1821. Beethoven was approaching the beginning of his third creative phase in 1814, the year of Sonata Opus 90. Completely deaf, he conjured up bizarre, thought-provoking worlds and translated his discoveries into deeply moving and often strangely mystical musical compositions. In terms of his piano compositions, the current Sonata serves as a springboard for his last pieces in the style. However, the two-part Sonata in E minor suggests very little of the ethereal aspects of the sonatas that followed. Its second part is wonderful, although it is also a little monotonous, but given Beethoven's preference for seriousness, it is simply delightful. Therefore, the power of the Sonata lies in its opening movement, which links sad tranquility with economical but cruel intensity, equating greatness with soul, and not necessarily with virtuosity.

### 3.1. 1st Movement – „Mit lebhaftingkeit und durchaus mit Empfindung und Ausdruck”

The mark for the first part means *With vivacity and always with feeling and expressiveness*. The material of the first part is concise, and the textures are particularly sensitive and delicate. The main theme of eight measures, which alternates between being powerful and serene, is more motivic than thematic, with

the same characteristic dotted rhythm pattern appearing in each of the four pairs of measures.

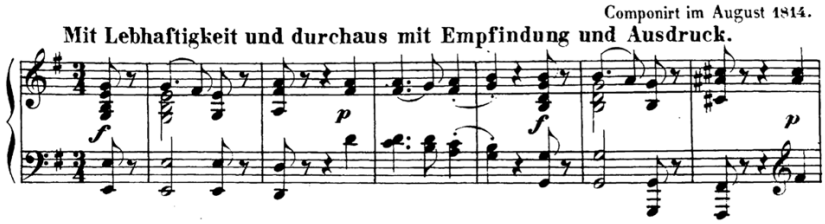


Fig. 1. *L. van Beethoven,* "*Piano Sonata in E minor, Op. 90*", *1st mov., mm. 1-8*

What follows is an indescribably creative passage with contrapuntal development, a phrase that seeks to contrast the war of opposing feelings unfolding in phrase 1.

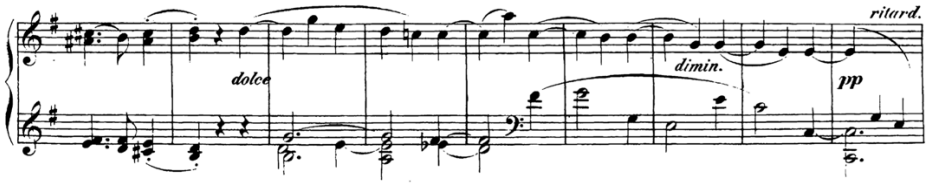


Fig. 2. *L. van Beethoven,* "*Piano Sonata in E minor, Op. 90*", *1st mov., mm. 8-16*

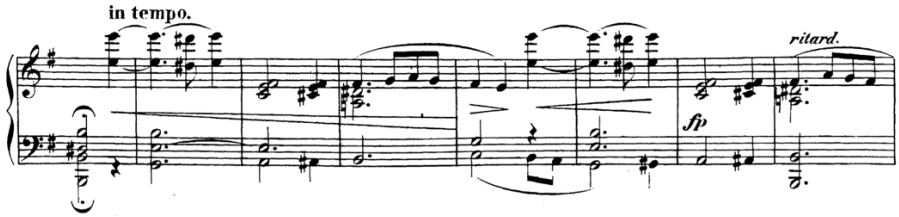


Fig. 3. *L. van Beethoven,* "*Piano Sonata in E minor, Op. 90*", *1st mov., mm. 16-24*

Immediately afterwards, Beethovenian drama takes control: a sequence of descending scales. We notice how the beginning and end of phrase 4 are dominated by the same motif, a lamentoso crescendo, and how the first two descending scales differ in both texture and character from the third descent.

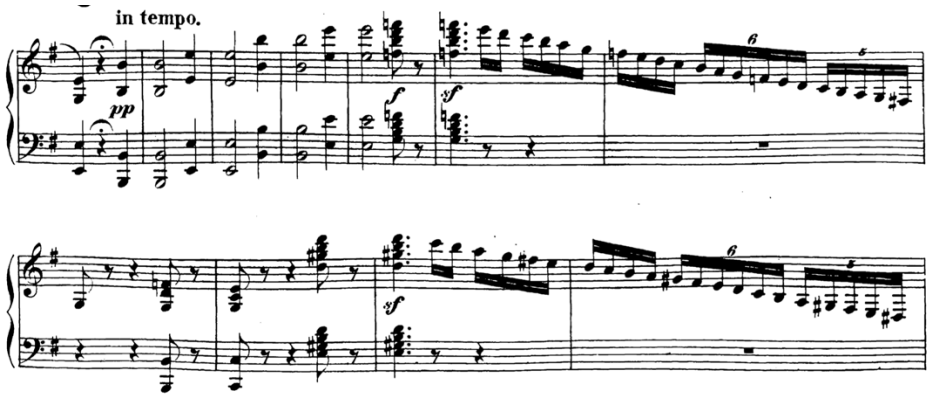


Fig. 4. *L. van Beethoven,* "*Piano Sonata in E minor, Op. 90*", *1st mov., mm. 24-44*

The fifth phrase is a preparation for the second theme, an introductory motif that creates suspense through repeated tense chords that demand a revelation. The end of the phrase is crowned by a wave from *pp* to *ff*, demanding a quick release from the captivity of the repeated chords.

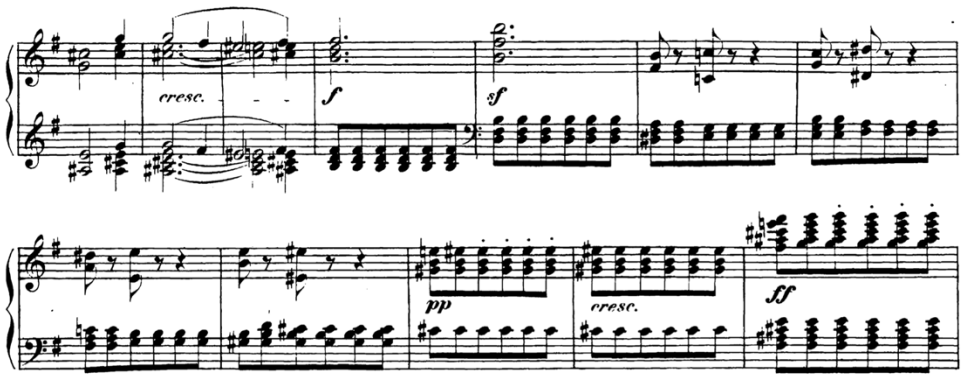


Fig. 5. *L. van Beethoven,* "*Piano Sonata in E minor, Op. 90*", *1st mov., mm. 45-54*

The second theme, similar to the original theme, the sixth phrase is more of a motif than a theme; the frenetic accompaniment is incredibly spacious, similar to an elongated Alberti bass. The melody is incredibly pious and discreet, even though the accompaniment seems to be the foundation of a very prominent and powerful melody. Here we can see Beethoven's drama again, which doesn't follow the rules, but is simply guided by strong and impactful feelings.

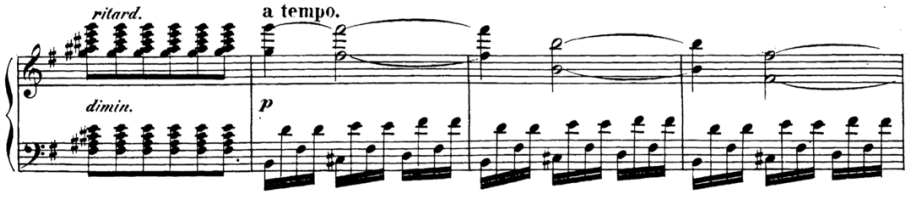


Fig. 6. *L. van Beethoven, "Piano Sonata in E minor, Op. 90", 1st mov., mm. 55-61*

After an unrepeated exposition, the development section consists exclusively of material from the initial phrases—the strongly punctuated rhythm and gentle responses. After a page of lamenting fragments, which bring to light a Beethoven who was meditative and, perhaps, emotional at the beginning of the movement, the movement ends melancholically, but still in the initial tempo.

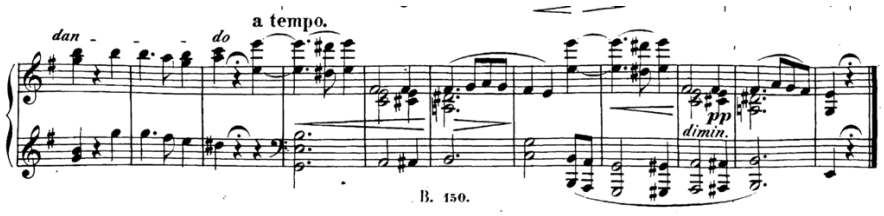


Fig. 7. *L. van Beethoven, "Piano Sonata in E minor, Op. 90", 1st mov., mm. 237-245*

### 3.2. 2nd Movement - „Nicht zu geschwind und sehr singbar vorgetragen"

The translation of the indication for the second part is Not so fast, but very cantabile. The composer ends the Sonata with a long finale in E Major, cheerful, warm and comforting, as if shaking off his introspection. The second part has a rondo form, A-B-A-C-A-B'-A'-Coda. The second part is longer than the first because of the consistent writing style, the serene atmosphere and the frequent, complete and unvarying repetitions of the theme. Although the Rondo Op. 90 makes brief forays into new territory, it never strays too far from the purity of its lyrical theme.

The theme is serene and lyrical, very different from the theme of the first part, characterized by p dolce. The theme is practically divided into two parts on a question-answer structure, 4 + 4 bars. We can observe the phrasing, the famous staccatos under the legato signs, which must stand out, being slightly marked. At the end of phrase 1, we are surprised by a subito piano, immediately after the crescendo. The second voice performs an Alberti-type accompaniment.

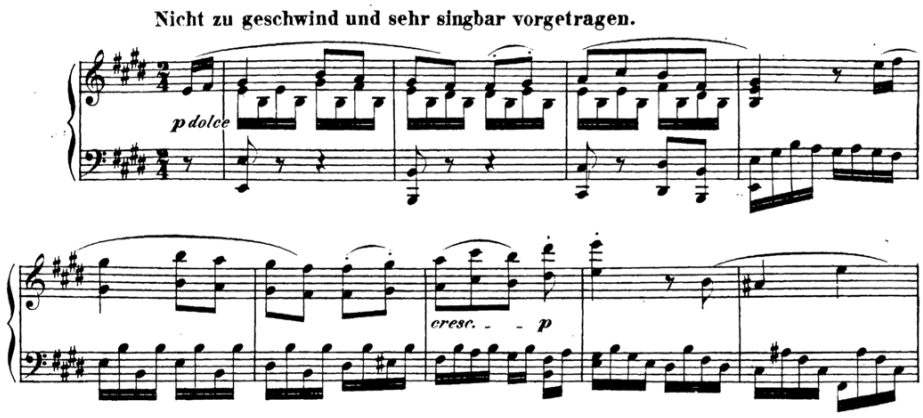


Fig. 8. *L. van Beethoven, "Piano Sonata in E minor, Op. 90", 2nd mov., mm. 1-9*

Following the thread of part A (the refrain), we arrive at phrase 5, which initiates verse B. Beethoven quotes the first two chords from the first part with those intervals and chords in the right hand. The similarity is reflected both in the rhythmic formula (eighth notes, dotted quarter notes) and in the register changes.

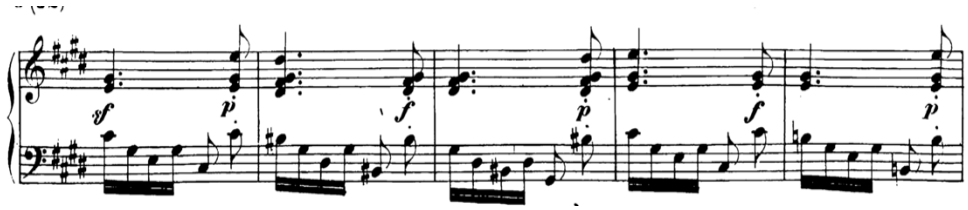


Fig. 9. *L. van Beethoven, "Piano Sonata in E minor, Op. 90", 2nd mov., mm. 33-37*

Next, we move on to phrases 6 and 7, the latter being a repetition of the former. Accompanied by latent polyphony, the right hand forms a melody in major sixth intervals. Both phrases are symmetrical, 8 measures long. One of the differences is that phrase 7 adds latent polyphony to the surface, with the second voice having an ambiguous effect.

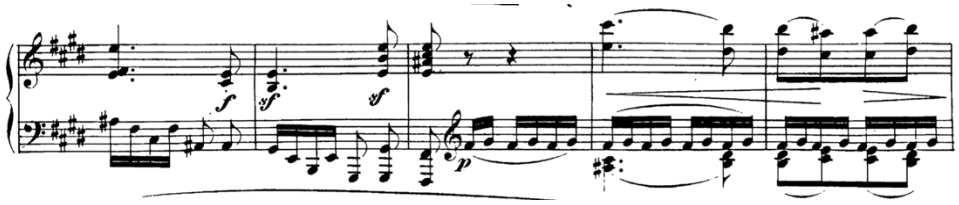

Fig. 10. *L. van Beethoven, Piano Sonata in E minor, Op. 90, 2nd mov., mm. 38-42*

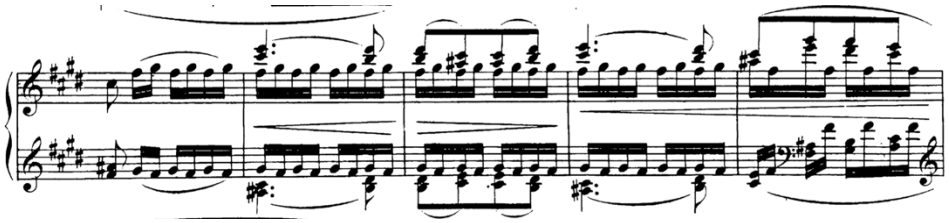

Fig. 11. *L. van Beethoven, "Piano Sonata in E minor, Op. 90", 2nd mov., mm. 48-52*

The most lyrical moment of stanza B is phrase 9, a passage accompanied by triplets, with a piano dolce character. The phrase is symmetrical, 4+4+2, and in the second part of the phrase the triplet accompaniment branches out into sixteenth notes, with the last two measures leading to the return of A.

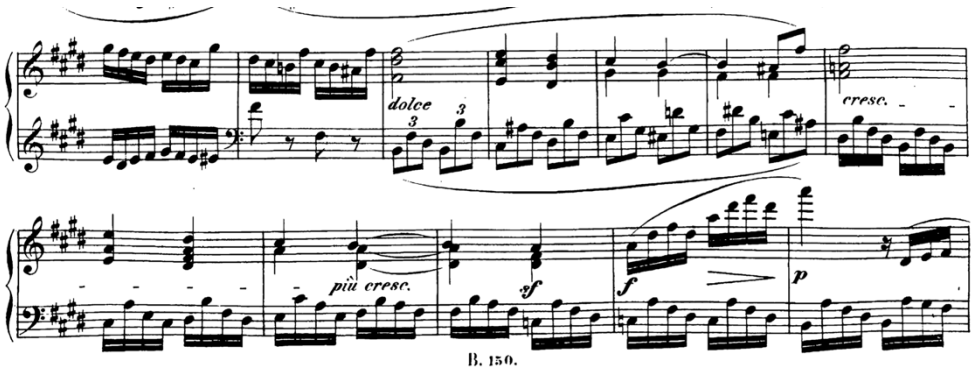


Fig. 12. *L. van Beethoven, "Piano Sonata in E minor, Op. 90", 2nd mov., mm. 58-62*

An exception to the exact repetitions of the theme is represented by phrase 29, where the return is varied. Here, the accompaniment moves to the right hand, and the melody to the left hand, with a lower register.

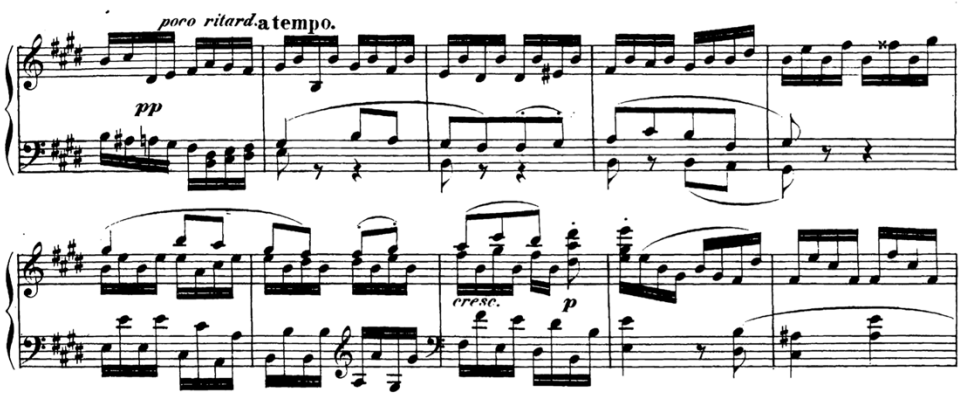


Fig. 13. *L. van Beethoven, "Piano Sonata in E minor, Op. 90", 2nd mov., mm. 230-239*

## 4. Conclusions

An analysis of the rhythmic and tempo relationships in Beethoven's piano sonatas reveals a subtle dimension of his formal thinking: the conception of time not as a mechanical succession of measures, but as a dialectical process of expressive becoming. In the spirit of Adorno's formulation of "form as process" (Adorno 1998, 102), Beethoven's temporal structure transcends conventional boundaries and becomes a space where pulse, proportion, and phrasing converge in a symbolic narrative of inner transformation. This vision appears in what Charles Rosen calls "tempo-relation" (Rosen 2002, 108): the maintenance of a fundamental pulsation which, although apparently varied, remains constant at the level of auditory and psychological perception.

Beethoven develops a system of tempo proportionality between the parts of a sonata, where each new movement derives from a precise ratio of the previous one. Examples gave in this article demonstrate the internal continuity of the beat and the architectural coherence of the discourse. These relationships do not involve a simple acceleration or deceleration, but a transfiguration of musical time, a phenomenon that Eero Tarasti interprets semiotically as a "metamorphosis of the temporal sign" (Tarasti 2002, 147).

The system of phrasing and mobile accentuation plays an essential role in the articulation of rhythmic discourse. The shift of accent from strong beats to intermediate positions, observable in the Piano Sonata in E minor, Op. 90, creates an internal elasticity that favors organic transitions between sections. Thus, unity no longer derives from symmetry, but from the tension between pulsation and articulation, between objective metrical structure and subjective expressive

intention. In this dialectic, Beethoven achieves what Tarasti would call a “semiotic narrative of becoming,” where each rhythmic transformation has symbolic and semantic value.

Considering these observations, it can be said that rhythm, in Beethoven, ceases to be a technical parameter and becomes the generating principle of form. The proportional continuity of tempos, the permanence of the background pulsation, and the mobility of the accent define an aesthetic of internal movement. This is a dynamic in which musical time is transformed into a vector of expression. According to Rosen's interpretation, Beethoven inherits the classical tradition of bipartite and tripartite proportions but extends it with unprecedented formal freedom. Thus, the sonata becomes a coherent but tense discourse between stability and becoming. In this sense, Beethoven's rhythmic unity is not a formal given, but the result of an inner logic of perception, where each tempo, each phrase, and each accent become signs of a sonic consciousness in continuous self-definition.

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