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# Crafting the "elevator pitch": joining rule-based and stochastic methods for musical procedural rhetoric in computer-aided composition

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**Abstract.** This paper examines the compositional process of "Elevator Pitch", a piece for cello and electronics. The work comes as a response to an artistic inquiry delving into how computational methods from the field of symbolic artificial intelligence can influence the development of compositional frameworks, in particular the combination of constraint algorithms with machine learning and stochastic techniques. From an artistic perspective, these methods are conceived as analogous to classic rhetorical formulas and serve as tools to organize both the local scope and overall form of the piece. I have termed this framework as *musical procedural rhetoric*. The idea of rhetoric formulations embodied in musical procedural rules strongly relates to the piece's conceptual backdrop, as a sardonic analogy of a political speech. The discussion on the constructive aspects of the piece further addresses aspects regarding the formalization of qualitative musical dimensions using an experimental expansion of the library Cluster-Engine in its implementation for Max.

**Keywords.** Computer-aided composition, constraint algorithms, Markov chains, rhetoric, procedural rhetoric.

## 1 Introduction

### The Basics of Rhetoric

Since antiquity, the study of rhetoric has been considered as a set of skills aimed at achieving a more persuasive manner of speaking and writing. The effectiveness of the rhetorical situation is usually facilitated through several types of linguistic artifacts, known as *rhetorical figures* or *figures of speech*. Examples of these figures of speech as *simile, metaphor, allegory, hyperbole, irony, antithesis, metonym, synecdoche, prosopopoeia, apostrophe, climax, incrementum, erclamation, and interrogation, among many others*. The essence of these figures of speech relies mainly on ornamental discursive techniques and entails an alternative meaning or function apart from its literal content.

The classic *Quadripartita Ratio* has historically been used as a framework for manipulating and varying discourse across various levels of linguistic structure [2]. In it, the figures of speech are classified within the four fundamental rhetorical operations: *adiectio*, *detractio*, *immutatio*, and *trasmutatio*. *Adiectio* involves adding or incorporating additional information to an argument or statement to reinforce a particular point. Most of the time refers to a form of arranging words or clauses in a sequence of increasing force. *Detractio* involves leaving out information or certain details to emphasize other aspects of an argument. *Immutatio* involves rearranging the order of words or phrases. Finally, *transmutatio* involves changing the form or structure of a word or phrase while preserving its meaning. In contemporary times, the *Quadripartite Ratio* has been used as a point of departure for the study and development of generative strategies for constructing narratives, and as a method of imitation by which one could transform a speech model into something new and original [3].

**Rhetoric and Music**

Historically, music has been influenced by rhetoric theory and terminology [4-6]. During the Renaissance and Baroque, composers often incorporated elements of rhetoric in their works, as they viewed an intrinsic connection between the rhetoric of language and the capability of music to stir and evoke emotions in listeners through the use of *affects*[1]. Composers such as Claudio Monteverdi displayed a profound comprehension of the relationship between music and lyrics in vocal music. In 1605, Monteverdi introduced the distinction between the *prima prattica* and the *seconda prattica*, or first and second practices, something that marked a shift in composition, moving from an established style to a more modern approach. In addition, composers of instrumental music also drew from the field of rhetoric to articulate their composition techniques [7]. Proficiency in using these figures emerged as a standard for measuring the aesthetic appeal and value of a musical piece during this time. Musical features such as melodic repetition, fugal imitation, dissonance or consonance, intervallic movement patterns, and even silence were formulated into processes widely applicable in diverse musical contexts (see Table 1).

In the 18th and 19th centuries, newer generations of composers began to view aesthetic ideals based on rhetorical formulas as outdated. Despite this shift, conventional musical forms, such as the sonata, continued to be analyzed using terms of rhetoric by writers and theorists of the time, in particular Johann Matheson, who highlighted the

[1] Affects have been defined as *emotional abstractions* or *idealized emotional states* [6, p. 12] that a composer was expected to arouse in the listener through a musical work.

importance of the *sentence* structure in shaping a rhetorical musical style, stating its intrinsic link to the musical idea itself. Mattheson viewed the need to employ rhetorical concepts to compose music, by claiming that *a good composition should have the same form as a good speech* [8, p. 48], and these views extended into the early 20th century [9]. However, as traditional elements structuring musical discourse started to dissolve, new forms of musical organization took shape, in open criticism of the rhetoric language-based ideas. Ultimately, the scientificist discourse of avant-garde movements in Europe further deviated from the idea of music as a speech-based art.

**TABLE I**. MUSICAL EQUIVALENT FOR RHETORICAL FIGURES.

| Rhetoric figure | Musical equivalent | As described by: |
|---|---|---|
| *Anaphora* | The repetition of a melodic statement in different notes in different parts. | A. Kircher (1601-1680) |
| *Auxesis* | Ascending consecutive repetitions of a musical passage. | J. G. Walther (1684-1748) |
| *Catabasis* | Descending musical passages expressing negative images or affections. | A. Kircher (1601-1680) |
| *Climax* | A gradual increase or rise in sound and pitch, creating a growth in intensity. | J. A. Scheibe (1708-1776) |
| *Epizeuxis* | Emphatic repetition of a motif or melodic phrase. | J. G. Walther (1684-1748) |

### Musical procedural rhetoric

The discipline of rhetorical code studies (RCS) has developed recently [11,13]. This area of study combines the classic understanding of rhetoric—how language can persuade and influence—with the study of software and computer code, essentially treating computational algorithms as rhetorical agents that function persuasively to induce or influence an audience to act in response to a particular message. In RCS, an algorithm is viewed as a system of signs, just like language, with its own grammar and rhetorical tools. An important concept is the idea of procedural rhetoric, developed by Ian Bogost [12]. This term refers to the idea that processes, especially the ones used in computing, are a means of persuasion. In this light, computational algorithms represented in computer code are viewed as rhetoric agents from a perspective based on procedure as a form of facilitating action.

The conceptual link between constrained computational methods in computer-aided composition and rhetorical principles, particularly *procedural rhetoric*, stems from the use of rhetoric-inspired formulations expressed as musical constraint rules in computer code, to generate a musical narrative. While I take a somewhat loose and metaphorical approach to this translation process, in my recent compositional output, the concept of musical procedural rhetoric has provided me with interesting considerations for delving into diverse facets of musical organization.

The compositional methodology for this piece explores a branch of computational methods for artificial intelligence known as Constraint Satisfaction Programming (C.S.P). In the field of computer-assisted composition, C.S.P has a long history [14-16], as it has served as a powerful tool for creating musical narratives by implementing musical rules expressed as logical statements, a process that is at the core of the concept of computational algorithms and algorithmic composition. In my recent work, the method of C.S.P is used in classical ways related to the organization of conventional parameters such as pitch and rhythm, as well as in what I see as not-so-well-explored implementations of it for contemporary music composition, something that I will explain further in this text.

## 2 Conceptual Backdrop of the Piece

### Social Acceleration and newer communication dynamics: The *elevator pitch*

The philosopher Hartmut Rosa has proposed that modern society can be described as an *acceleration society*, by observing the evidence of technological acceleration and an increase in the pace of life due to a chronic shortage of time resources [17]. As contemporary society embraces a fast-moving dynamic where instant updates are consumed through smartphones and social media engagement is a cornerstone of a technology-interconnected world, everyday communication becomes *accelerated* and *temporarily fragmented* [18, p. 1]. In light of this new paradigm, newer forms of communication that emphasize the briefness and succinctness of information delivery thrive. One of these new types of discourse is the *elevator pitch*. An elevator pitch is a type of summary speech that defines an idea, product, or company and a value proposition for it. The name reflects the idea that it should be possible to deliver a summary of the topic in the duration of an elevator ride, usually between approximately 30 seconds and two minutes. For an elevator pitch, it is important to communicate things in a manner that is understandable for large segments of the population in a short time, and it is also important to increase the communicational effectiveness, to induce a listener to make a decision sought by the speaker.

It is not until recently that the high effectiveness of these discursive methods has been studied from an empirical perspective [19], and this has probably contributed to these pitches landing recently in the world of political communication. The phenomenon of the professionalization of political communication, mainly represented by the rise of *political marketing*, has been studied as a means of social manipulation in contemporary Western democracies [20-22]. Some of the techniques of these new political communication strategies and discursive modes rely on the generation of strong and brief key messages where, by employing a directed selectivity on the supporting information presented, the full disclosure of the facts is avoided. Thus, a political discourse ruled by the dynamics of these communication strategies is usually deprived of a meaningful message and converted into a performative act aimed solely at exacerbating passions, where audiences are targeted for plain opinion driving on complex social issues where subjectivities and hate discourses are prone to arise, such as those regarding immigration, minorities rights, among other topics. In many cases, the use of these communication strategies has been linked to authoritarian and intolerant forces that use them as the entry door to step into the political scene.

The piece is a sardonic analogy to a political speech, which is portrayed here as empty of substance, and as an artificial construct of a "laboratory" rhetoric relying purely on historical conventional rhetorical strategies. The piece thus poses an artistic focus on these contemporary methods of communication -such as an *elevator pitch*- and the potential for manipulation of sound-bite content by political figures. The title suggests an ironic connection between a content-lacking political speech and an algorithmic musical organization. However, despite the potential analogy between the creation of musical narratives through constraint computation and a real-world phenomenon, the composition itself does not intend to represent this idea. Rather, the chosen compositional methodology serves the purpose of creating an artistic allegory of *emptiness* in political discourse. In addition to the political or politicized message that the piece aims to convey, the study and development of the methods employed here are aimed at exploring and creating valuable artistic works.

## 3 Compositional Methods

Two overall main inquiries were explored when creating this piece. Firstly, the constraint rules that govern the local organization of the musical narrative focus mainly on idiomatic sound production types for the violoncello. An important motivation for this has to do with exploring ways of overcoming biases in computer-assisted composition that often view qualitative or *weak*[2] musical parameters as secondary to pitch and rhythm[3]. For that, some of the compositional work was concerned with

[2] The concept of weak musical parameters is not universally accepted. However, the parameters often considered most potent are pitch, rhythm, and dynamics, with articulation sometimes viewed as a more subtle or nuanced aspect of music expression.

[3] Initially, this sentence refers to the dominance of pitch and rhythm as the primary musical compositional domains through the history of Western music. This was addressed critically by James Tenney in the early 60s, as he proposed that every musical parameter could hold structural importance within a musical phrase [10]. However, in computer-assisted composition, I believe that the issue of hierarchical formalizations persists. At first glance, an observation of the established theory and practice in the field seems to consider mainly those musical domains directly related to pitch (note, pitch class, frequency, MIDI cents, etc.) and duration (milliseconds, rational values, onsets, etc.) as the only valid for formalizations and compositional operations. In this sense, I believe that further compositional research towards formalizations of diverse musical parameters is desired.

investigating diverse ways of how these can be formalized and operated as a musical *search space*[4]. Secondly, the implementation of a *steered* Markovian generation process[5], facilitated by the combination of constraint algorithms and Markov chains by using a Markovian transition table as a constraint rule. Conventionally, it is accepted that stochastic processes such as Markov chains effectively capture overall musical tendencies (general distribution of events in time, ambit, etc.), at the cost of neglecting the local scope of musical information due to their inherent probabilistic nature. On the other hand, constraint algorithms offer a more detailed control through the definition of rules that constrain the local scope (individual notes, rhythmic figures, time position, harmonic intervals, etc.) [25]. Therefore, it is expected that a combination of these two methods could potentially yield more flexibility for developing sets of rules seeking a compositional balance between these two scopes.

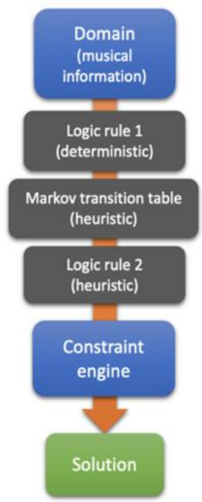



**Fig. 1**. A schematic representation of the flow using constraint algorithms. A domain can consist of any symbolic information (such as pitches, durations, text, etc.). The three subsequent modules exemplify a chain of three rules. The constraint engine enforces these rules in possible combinations of elements, and finally, the solution -or solutions- is output.

[4] In the field of Artificial Intelligence, the set of solutions among which the desired solution resides is called *search space* or *state space* [23].

[5] Previous investigations on steered Markovian generation have been carried out for example Pachet and Roy [24]. My implementation essentially follows the same logic, namely, using deterministic control constraints, and defining the Markovian property as a cost function to optimizein my case, the weight for a heuristic rule-. My interest, however, was to implement this process in Max, using the CAC libraries 'PWconstraints' and 'Cluster-Engine' recently ported to Max by Julien Vincenot and Örjan Sandred.

For the composition of the piece, I relied extensively on a computer-assisted composition tool named Cluster-Engine created by Örjan Sandred [26], a constraint engine specialized for music composition that is part of an external Max[6] library named MOZ'lib[7]. I have focused on the experimental feature of Cluster-Engine known as *Multidomains*, which allows the generation of constraint relations between any musical information existing within a polyphonic texture that can be encoded symbolically as numbers or strings of characters, for example, instrumental articulations and techniques, lyrics or any other type of score annotations[8].

## 4 Musical material and form

The musical material -in the form of rhythmic and melodic gestures- is mainly derived from the sonification of a speech fragment[9] from Donald Trump. The opening phrase of Trump's inaugural speech as president of the United States, pronounced on Jan. 20, 2016[10], *"The time for empty talk is over"* was analyzed using the Spear[11] software focusing on the duration and energy of its fundamental frequency[12], which was later translated into symbolic information as representations of a melodic contour.

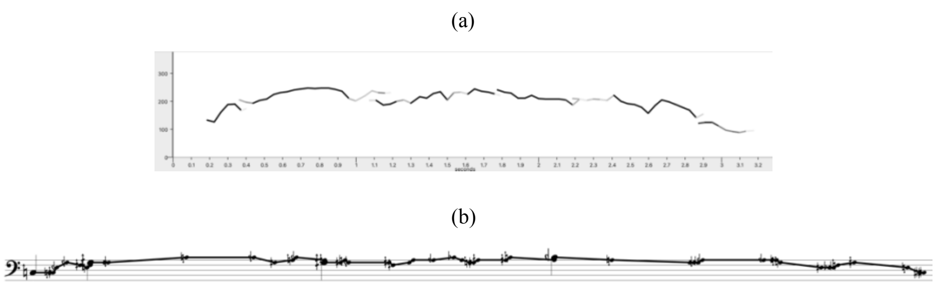



**Fig. 2**. Above, graph (a) represents the fundamental frequency contour of the phrase "the time for empty talk is over", pronounced by Donald Trump. Below, in (b) is shown the phrase's melo-rhythmic profile.

[6] https://cycling74.com/

[7] MOZ'lib can be downloaded here: https://github.com/JulienVincenot/MOZLib

[8] Other libraries that address this issue are for example Abjad and Straheela [27, 28].

[9] Some historical composers who have developed methodologies related to the translation of speech and prosody information into musical notation are Johnathan Harvey [29] and Peter Ablinger [30]. Currently, I have been interested in the work of Fabio Cifariello Ciardi [31, 32].

[10] The video of it can be seen here: https://www.youtube.com/watch?v=XZn8tFbISpo (originally retrieved on January 30, 2023)

[11] https://www.klingbeil.com/spear/

[12] The fundamental frequency or F0, is usually defined as the lowest frequency of a periodic waveform. In the case of speech, it usually equals the perceived melodic contour of a spoken phrase.

Formally, the piece is constructed as a linear flow of chained musical gestures derived from this sonification that moves forward as the dialogical interaction between the instrumental part and the electronics, driven by sound events' chronometric density and *expansions and compression of the musical parameters of frequency and intensity*, allowing for a build-up of energy leading to a formal climax and a posterior recession. The chosen *archetypical* musical form for this piece is strongly connected with the Aristotelian concept of *narrative* or *curse*[13] (fig. 3), which emphasizes that stories should have a narrative structure with a logical chain of cause and effect where earlier events are related to current events and will be perceived as connected to future developments [34].

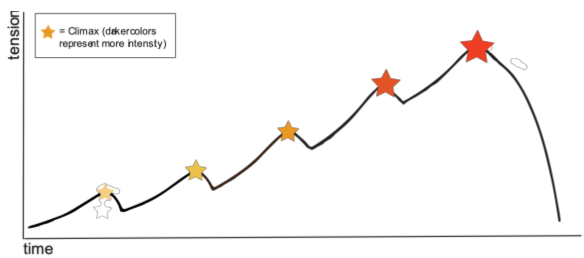



**Fig. 3**. A schematic representation of the Aristotelian narrative.

The piece begins with breath sounds presented in the electronics, a sound that proposes a type of *inward-outward* gesture and an interruption of the flow towards the end (halted inhaling, silence, and irregular exhaling). These gestures are important and will keep developing throughout the piece, as seeds for processes of expansion and compression and interruptions of the flow. Later in the piece, this category of inward-outward translates into sounds produced with *vibrato*, *tremoli* between harmonics, using notes which are either half-stopped or fully stopped in the left hand and *vertical bowing tremolo* (fig. 4). The gesture of interruption becomes evident within the narrative as certain musical flows are abruptly cut and juxtaposed with contrastive elements. It is possible to see especially in fig. 5, when the appoggiaturas start breaking the flow in increasingly shorter periods, and in the final section from m. 96. The inward-outward gesture becomes the seed for the posterior process of expansion of melodic profiles as *upward-downward*, metaphorically related to the equivalent rhetoric processes of *additio* (or *auxesis*) from the Quadripartite Ratio (fig. 7).

[13] In connection with the conceptual background of the piece, some authors have discussed the persuasive power of *Aristotelian* narrative and how it has been applied to various forms of communication, from fiction to product pitches [33].

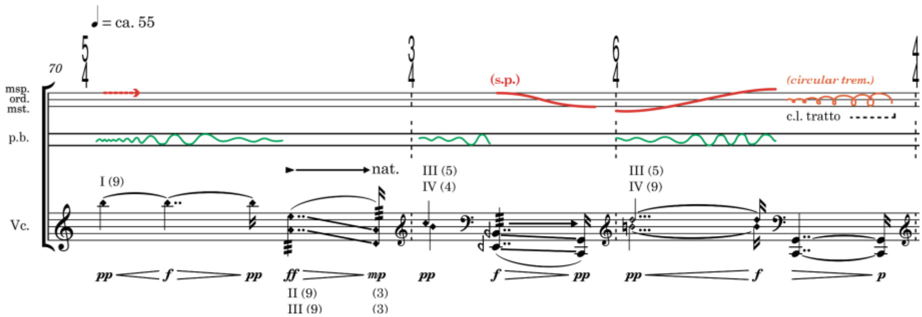



**Fig. 4**. MM. 70-72.

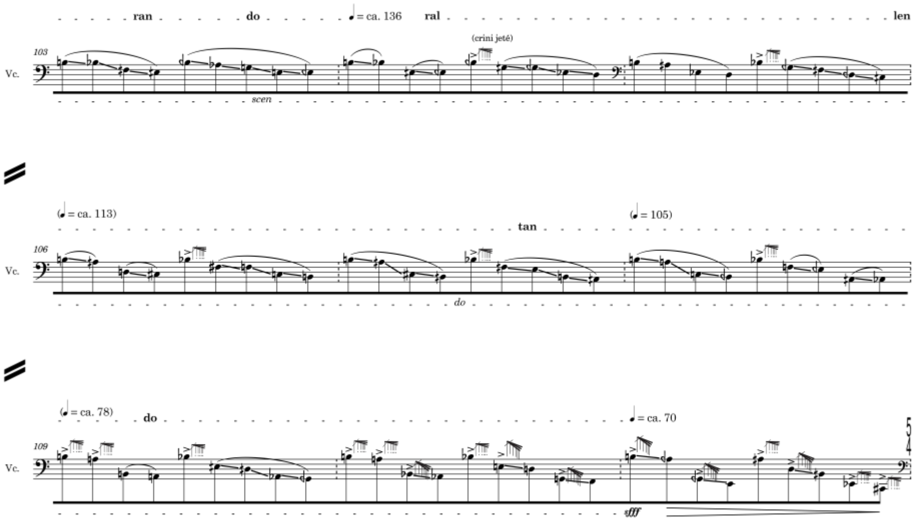



**Fig. 5**. MM. 102-111.

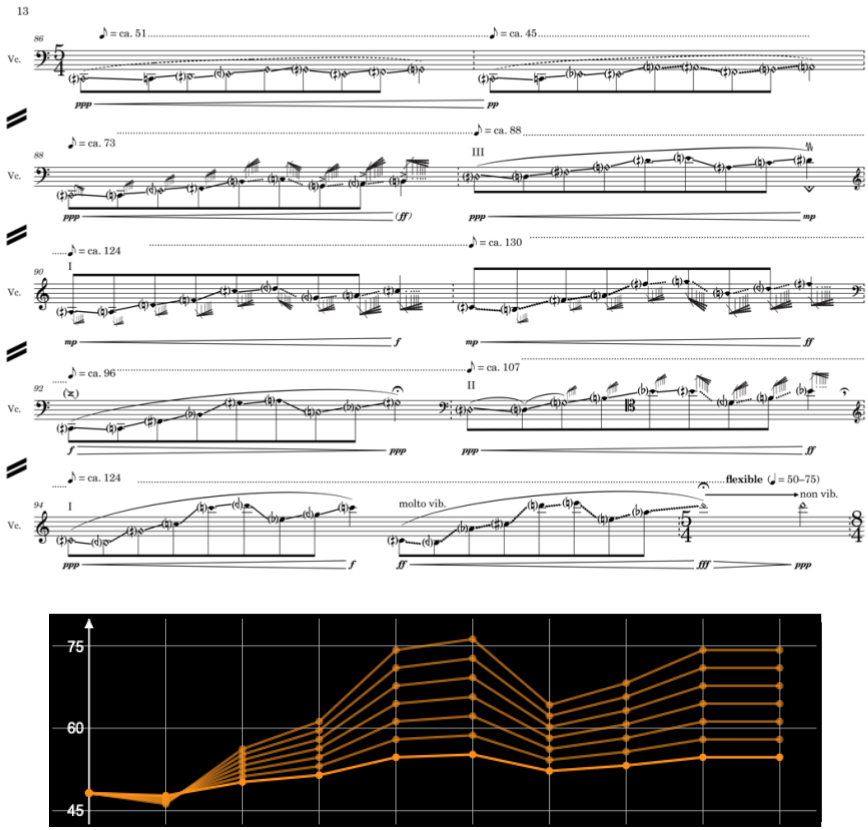



**Fig. 6**. Measures 86-96. Below can be observed a representation of the same melodic succession and how it expands over the pitch range, as break-point function lines. The x-axis represents MIDI notes, and the y-axis represents time.

After the highest energetic point of the piece in m. 125 (fig. 7), a final fragment breaks the dynamic of the rule-based instrumental sound production unfolding, proposing a shift of the scope of the rules towards durations and pitches. In contrast to the rest of the piece, this last section sounds ironic and somewhat simple, relating a deliberately simple musical narrative resulting from the use of constraint rules for operating permutations of pitch and durations (fig. 8). Moreover, employing a superball to rub the back of the fingerboard imparts a sonic texture reminiscent of nonsensical utterances.

The gesture of interruption of the flow by the lower overpressure $C_2$, plus the use of silence ends up completely breaking apart the flow towards the end of the piece.

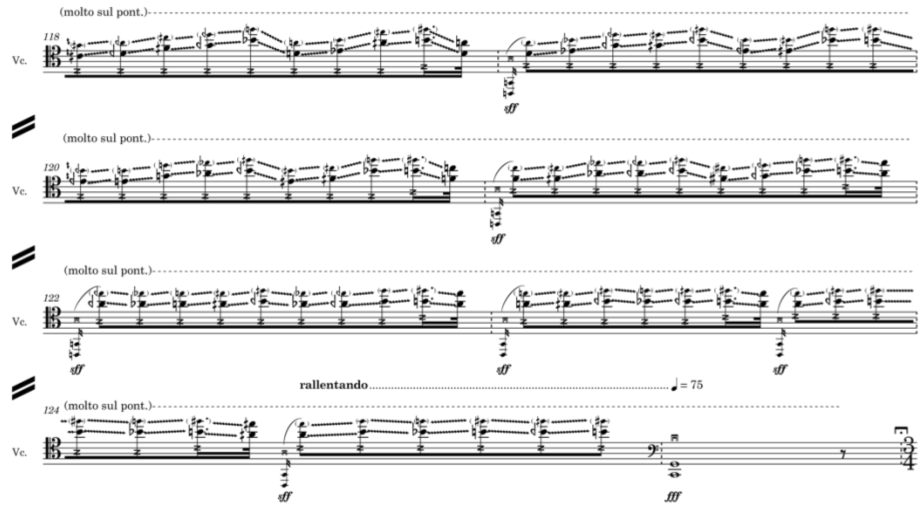



**Fig. 7**. (a) Climax, m. 118-126.

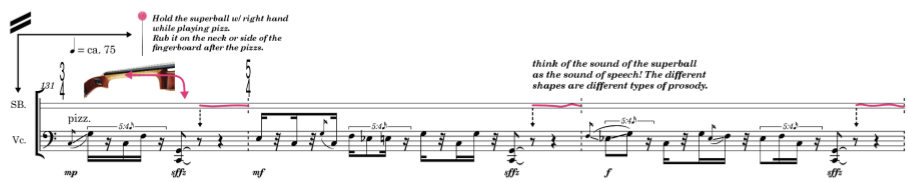



**Fig 8**. Closing section, m. 131-133.

## 5 Constraint rules

The permutational and recombinational logic implemented for the structuring of musical parameters inspired by the idea of *permutatio* from the Quadripartite Ratio is enforced by mainly two constraint rules, expressed as LISP code[14]. The first rule involves the repetition of elements within sublists, while the second tackles repetition across consecutive pairs of sublists. In the first example (a), within each sublist, only two elements should repeat, and the rest should be different. In the second example (b), only two elements are repeated in consecutive sublists, and the elements within each sublist are different. Below these rules are expressed as lisp code:

[14] LISP is a programming language considered the father of the programming languages used for artificial intelligence. It is extensively used in computer-assisted composition, in environments such as Open Music, PatchWorks, and more recently Max [35, 36].

```
; rule (a)
( lambda ( a b c d )
  ( = 3
    ( length
      ( remove-duplicates ( list a b c d ))
    )
  )
)

; rule (b)
( lambda ( a b c d e f g h )
  ( progn
    (setq sublist1 ( list a b c d ))
    (setq sublist2 ( list e f g h ))
    ( = 2
      (let ((count 0))
        (dolist (element sublist2)
          (if member element sublist1)
            (incf count)))
    count)
  )
)
```

**Rule (a)**

( **1 1** 2 3 ) ( 1 **2** 4 **2** ) ( **4** 2 **4** 3 ) ( **2** 3 **2** 1 ) ( **3 3** 1 4 ) ( **4** 1 2 **4** ) **etc…**

**Rule (b)**

( **1 2** 3 4 ) ( **1** 5 7 **2** ) ( **2** 4 **5** 3 ) ( **3 2** 1 7 ) ( **2** 4 5 **7** ) **etc…**

**Fig. 9**. LISP rules (a) and (b), and examples of results using rules them.

These rules have been applied for the temporal organization of the bowing position, bowing pressure, dynamics, various types of tremolos or vibrato, and instrumental articulation. The candidate elements for this rule consist of a list with all the possible bowing positions -in this case, the choices have been restricted to *ordinario* (ord), *sul ponticello* (sp), and *sul tasto* (st) all the possible trajectories between them. In Figure 3 can be seen how rule (b) constrains the bowing positions. The rule thus enforces that two elements should be common within consecutive sublists of four elements (from bar 1 to 2, the two common elements are ‘s.t.-s.p’. and ‘ord’).

Naturally, as more musical parameters become constrained simultaneously, the combinatorial possibilities increase exponentially. In the following example, the constraint engine is used to generate a musical sequence by constraining three musical *voices*[15]: durations, bowing position, and bowing pressure. Here, the three voices are constrained in a cascade fashion: the first voice (V0) follows a permutational rule, and the candidates for the rest of the voices are constrained to certain rhythmic figures. For example, longer bowing trajectories (e.g. “sp-st”) can only occur in whole notes. Static bowing trajectories (e.g. “sp”, “ord”, “sp”) are restricted to quarter and eight notes, and intermediate trajectories occur only in eight and sixteen notes. In addition, voices 1 and 2 are constrained by the rule (a) discussed above.

TABLE II: CASCADE-TYPE ORGANIZATION OF CONSTRAINTS.

| Voice/Param. | Candidates | | | Rules |
|---|---|---|---|---|
| V0 - Rhythm | 𝅗𝅥 | ♩ ♪ | ♪ 𝅘𝅥𝅯 | Permutations:<br>𝅗𝅥 ♩ ♪ 𝅘𝅥𝅯 |
| V1 – Bow pos. | (st-sp)<br>(sp-st) | (ord-sp)<br>(ord-st)<br>(sp-ord)<br>(st-ord) | (ord) (sp)<br>(st) | Rule (b) |
| V3 – Bow press. | (flaut-overp)<br>(overp-flaut) | (flaut-ord)<br>(overp-ord)<br>(ord-flaut)<br>(ord-overp) | (flaut) (ord)<br>(overp) | Rule (b) |

## 6 Electronics

The electronic part is designed as a live-electronics component, originating from the combination of signal processing and sound synthesis with the use of speech sound samples that are played via transducers through the instrument’s body, transforming it into a sort of *speaking* cello. These samples consist mainly of stochastically constrained

[15] *Cluster-Engine considers each musical dimension to be constrained as a musical voice in a polyphonic texture.*

generated text transformed to speech by the software VoxBox by Myifone[16], using a synthetic voice that sounds like Donald Trump.

**Stochastic constraints**

In order to create the text for the electronic voice, I implemented a generative process that relies on the combination of constraint rules with Markov chains. In practice, the constraint engine uses a Markovian transition table as a constraint rule. This means that the constraint engine checks that every combination of candidates (the candidates are letters or syllables, depending on the order of the Markov chain) is represented as a transition state from the Markov matrix. As Markov chains are based on probabilities for certain transitions to occur, a second rule checks that each transition in the solution matches the probability of appearing as it exists in the Markov matrix. As constraint rules are feasible to be chained, Markov rules can be combined with other constraint rules, for example -in the case of using text-, patterns of rhyme and alliteration[17], or poetic structures.

The example below was created using a 1st-order Markovian transition table of Trump's inaugural speech as a constraint rule in combination with the aforementioned lisp rule (a). Namely, for every four letters, two should be repeated and two different.

The resulting text follows a 1st-order Markov probability matrix of Trump's speech but at the same time follows the aforementioned rule (a):

*Peoeceacayaianinvive*
*Ebyeysesrerbrcrdrudu*
*Mphpapipepreroeonenb*
*Eiuinifieferecrcarak*

In the following example, I created five shorter words using the same rules discussed above, but I added a rule that constrains the text output to have a determined endinrhyme pattern (a b a b a). The time for searching the possible solutions became considerably longer:

*Daldlydyoy (a)*

[16] VoxBox by Myifone allows the user to generate speech using AI-based voices trained with voices of celebrities. It can be downloaded here: *https://filme.imyfone.com/voice-recorder/*

[17] It is important to mention that equal typographical beginnings or endings don't imply alliteration or rhyming -and vice versa- in the English language. This issue has been addressed in a different piece, in which this same process was done using the IPA alphabet. In that case, the correspondence between symbols and sounds is univocal. In any case, the result using the Latin alphabet was not so far from what I expected.

*Gefeoenean (b)*
*Puspsosyoy (a)*
*Olsosasnan (b)*
*Ewbebyeyoy (a)*

To take these ideas further, I expanded the Markov transition table into 2nd and 3rd order, and I started creating sentences with rhyme schemes such as (a b a b a b), as verses from a poem:

*Wards overnmen itselves cities (a)*
*Jobs families alle ones an car (b)*
*Kingth strulers ourse of dones (a)*
*Ves of mich unrealittle restar (b)*
*Lves rebuild first anot to res (a)*
*Fusing fourished intone an car. (b)*

Finally, I implemented combinations of rules in order to create a sonnet with a rhyme scheme abab cdcd efef gg:

*Rusten again trulerse ten your in ther,*
*Rospense future truly mich thangs the an,*
*Ges contry andscattening its which pover,*
*Ysted it behindustem flourseasonable jan.*
*Magnificential mentermies that that nowled,*
*Repain is neight hearterseasonal trates,*
*Everts to everts we trationable for sted,*
*Deprived herent is americh with no longes.*

*Ge at it bush poverts deple by on today,*
*Lef buted ind little defend of dolle thou,*
*Dle face ten to be forgotte remember decay,*
*Tries has willions armies that to cou.*

*Job dolledge alle has neign inner shards,*
*His movery at it back togethen too mands.*

# 7 Discussion

### Formalization strategies

When composing this piece, I was also interested in exploring how computational rule-based methods can be harnessed to include a range of musical parameters exceeding the typical confines of melody, harmony, and rhythm, for example, a wide array of instrumental techniques including bowing position, bow pressure, types of *tremoli* or vibrato. In most cases, these parameters exist as text indications or instructions. In the field of statistics, these are known as *categorical* or *qualitative* variables, and a conventional strategy to formalize categorical variables into mathematical models - which in this case can be equated to computer-assisted composition workflows- is to use logical constraints [38]. Cluster-Engine, in its version for the Max platform, is designed around the Bach[18] external library's environment, and it includes an experimental feature named *Multidomains*, which represents a powerful expansion of its capabilities, as it allows logical constraining of qualitative information as metadata contained in Bach's *slots*, such as score annotations, articulations, and lyrics, among many others. Thus, to formalize and organize these musical domains in the piece, two strategies were taken. The first one was to create logical constraint rules that were expressed mainly as string equality tests. (e.g., bowing positions such as *ord, sp, st, mst*, etc.). For example:

```
( function ( lambda ( a )
 (if ( > ( first a ) 1/8 )
   ( not ( equalp (second a ) 'stacc))
 t )
))
```

**Fig 10**. Example of a logical constraint rule consisting of a string equality test expressed as follows: If the first value of the list *'a'* is larger than 1/8 (eight-note), the second value of 'a' should be not *'stacc'*.

Secondly, candidates were encoded as integer numbers that were later translated into strings by following a simple chart. This turned out to be a much more efficient way, faster, and lighter in terms of computation resources. For example[19]:

```
( function ( lambda ( a )
 (if ( > ( first a ) 1/8 )
   ( not ( = (second a ) 1))
 t )
))
; 1 = "stacc"
```

[18] https://www.bachproject.net/

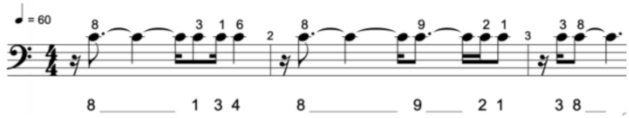
[19] This rule is a simplification for the purpose of exemplifying the formalization technique. The actual rules used in the piece involved more complex interactions between musical parameters.


**Fig. 11**. Example of a logical constraint consisting of a numeric equality test, used to organize the bowing position of the cello over a melodic sequence following the aforementioned **rule (a)** *-only two repeated elements in sublists of length 4-*. Below is shown the output of this rule.

## 8 Conclusions/Final Reflections

For the composition of this piece, I have implemented a compositional framework that I have termed *musical procedural rhetoric*. The process aims to exemplify how the logic and procedural nature of constrained computation and stochastic methods can be combined to create complex and ultimately expressive musical narratives. In this piece, the sound material, and the constructive method are anchored to a conceptual backdrop, based on the ironic resemblance between an elevator pitch as a content-devoid political speech and an artificial construct implementing a type of 'laboratory' rhetoric, and its potential misuse in political communication as a tool for thought manipulation. The selection and use thought the piece of Donald Trump's speech is not coincidental, as in my view, he exemplifies a type of politician who relies on carefully crafted, rehearsed laboratory-made speeches which most of the time are emptied of meaningful content and are reliant on cliches and effectist phrases. As I see it, the aforementioned speech is a clear example of this. Although Trump may be the most distinctive one and well-known due to his highly mediatized profile and history, he is certainly not the only one and examples of these can be found across the full spectrum of political ideologies. In this sense, an important question -which is still unanswered-revolved around the problem of bringing Trump's voice to the center of the scene, without turning the piece into a parodical cliché, or being labeled with a political stance that observes no nuance, which is not the case. A critical reflection around this problem is still onging.
Finally, the composition of this piece is part of a process of addressing an important personal artistic research inquiry. As a composer mainly reliant on computer-aided composition workflows, I aim to investigate how to create musical narratives that seek a deeper connection between ideas, poiesis, sound results, and reception, aiming to go beyond a merely formalistic approach. However, the audience is ultimately who should judge the aesthetical value of these methodologies.

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