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LISZT FERENC ACADEMY OF MUSIC

COMPOSITION DEPARTMENT

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The research themes of DLA dissertation titled

THE APPROACH OF MUSICAL VERTICALITY ACCORDING TO LAYER’S MODEL

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The antecedents of the research

One possible way to dissolve the pitch-chaos in the atonal music, established due to the inexistence of the organizing tonal principles, represents the recognition of the symmetry and regularity laws. The german scholar H. Erpf in 1927 speaks already about symmetrical chords, which are built up of equal intervals – meaning pitches of same value. According to his opinion, these structures are of basic importance in the atonal music where they could have no funtion at all. Continuing the above idea of geometric and architeconic space (mirror or axle) symmetry, we can speak about half- and wholetone-chords, minor and major third-chords, perfect fourth-chords etc., considering the occuring interval from which is built up the symmetrical structure. On the other hand, a re-emerging idea in Ernő Lendvai's concept is the symmetrical center-point of our pitch system, represented by *re* (D), considered the point of atonality beside the *si* (G#-A*b*), located at a distance of tritone. Furthermore, Allen Forte, inspecting the similarity relations of the equally tempered twelve-tone system's pitch groups, establishes the presence of symmetry even if the interval vectors are minimally similar: a relation is symmetric if for every a in the domain and b in the range, whenever 'R (a, b) is true, R (b, a) is also true', while the symmetric property is reflected in the triangular shape of the matrices.

The methods of the research

Almost every preserved pitch-system theory of antique or newer musical cultures is related somehow to the principles of symmetry. Starting from Hermann Wyle's symmetry-interpretation, I've analised the occurencies of the bilateral (mirror), shifting (translational) and turnover (rotational) symmetries in abstract types of folklore-like intonations, as well as in the pitch-system theories of different musical periods, until our days. If we admite that in the piano-like tempered twelve-tone system the simple intervals consist in: 1 (halftone), 2 (wholetone), 3 (minor third), 4 (major third), 5 (perfect fourth) and 6 (tritone), in a range of one octave we'll have a following number of different pitches for each symmetrical structure (built up of simple intervals):

simple interval	**number (#) of different pitches**
1	**12** (#13 = #1 in 8^{va})
2	**6** (#7 = #1 in 8^{va})
3	**4** (#5 = #1 in 8^{va})
4	**3** (#4 = #1 in 8^{va})
5	2.4
6	**2** (#3 = #1 in 8^{va})

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Symmetrical structure using the perfect fourth represents an exception, because 12 : 5 = 2.4 which isn't a natural number. In this case, the conventional range of one octave won't be relevant; these arguments implicate a revision of the octave-based musical thinking.

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The results of the research

A new approach of the twelve-tone set implicates the inauguration of a new harmonic terminology. One have to observe that among the symmetrical structures presented above, there're some which can be described using the old harmonic denomination, like 'diminished seventh chord' for #3 or 'augmented triad' for #4, and at the same time there're some others which cannot. For this reason we've introduced a couple of terms with new meaning.

1. Layer: vertical structure, formed from at least two elements (pitch and/or gap), based on interval relations
  1.1. Classification (aspect of configuration)
    1.1.1. symmetrical
    1.1.2. asymmetrical
    1.1.3. built up from one interval
  1.2. Classification (aspect of saturation)
    1.2.1. saturated
      1.2.1.1. complete (perfect)
      1.2.1.2. incomplete (imperfect)
    1.2.2. unsaturated
2. Symmetrical layer: vertical structure, formed from at least two intervals, built up on principles of symmetry
  Classification:
  2.1. homogeneous (built up of identic intervals)
  2.2. heterogeneous (built up of different interval)
3. Relationship between layers:
  3.1. two symmetrical layers having identical structure are in symmetric relations, free from the classification of the symmetrical layers apiece (homogeneous, heterogeneous)
  3.2. two asymmetrical layers may have relations of:
    3.2.1. shifting (translational or chain-) symmetry
    3.2.2. bilateral (mirror-) symmetry
    3.2.3. no symmetry
4. Homogeneous symmetrical layer: saturated vertical structure, built up of identical intervals, which if having one more element (pitch and/or gap), this would be an octave-like repetition of an earlier one
5. Complex: symmetrical twelve-tone structure, strictly built up of 12 different pitches
  Classification:
  5.1. symmetrical
    5.1.1. homogeneous
      5.1.1.1. axle symmetry (even number of leyers)
      5.1.1.2. layer symmetry (odd number of layers)
    5.1.2. heterogeneous (possible axle symmetry)
  5.2. asymmetrical

6. Saturated layer: such a vertical structure which constitute a complex *per se*, or the multiplication of it will result a complex

7. Homogeneous symmetrical complex: twelve-tone vertical structure, built up strictly from 12 elements (pitches and/or gaps), composed from one, two, three, four po six identic set-up symmetrical layers

8. Simple intervals: minor second (1), major second (2), minor third (3), major third (4), perfect fourth (5), augmented fourth or tritone (6)

9. A homogenous symmetrical layer, built up from simple intervals, has 12 / ***i*** elements, if ***i*** is divisible with 12 (where ***i*** is the size of the simple interval, taken in half-tone steps); the only exception is the perfect fourth (***i*** = 5). It isn't possible any tritone-based homogeneous symmetrical layer.

10. Axle interval: the interval between the nearby elements (pitches and/or gaps) of two layers

Conventional notation: **I**

Conventional base value: **I** = ***i*** – 1

11. Layer's field: the area between the two extreme elements (pitches and/or gaps) of a layer

12. Layer-linking:

12.1. from the aspect of the axle interval

12.1.1. conjunction (**I** = ± 1)

12.1.2. disjunction (**I** isn't equal with 1; in the case of homogeneous symmetrical layers in addition **I** isn't equal with 0)

12.2. from the aspect of the layer's field

12.2.1. parallel or collateral, **I** is greater or equal than 1, if there is no common portion of the two neighbouring layers

12.2.2. cutting or incisive, **I** is smaller or equal than –1, if one or more elements (pitches and/or gaps) of a layer get into the layer's field of the neighbouring layer

12.2.3. tangential, **I** = 0 (in the case of heterogenous symmetrical or asymmetrical layers)

13. If simple intervals are used, the number of symmetrical layers is equal with the size, taken in half-tone steps, of the building interval of the symmetrical layer in question

14. In the case of simmetrycal comlexes, the number of the axles of symmetry is one less then the number of the symmetrical layers

15. Any asymmetrical complex can be scored up like a section of the summation of finite number of homogeneous symmetrical complexes.

The canonic formula of the homogeneous bi-layering complex is:

i <k, x–y>

where **k** is the coordinata-value of the lowest element (pitch and/or gap) of the complex; **x** is the decimal code-number of the left-sided layer; **y** is the decimal code-number of the right-sided layer.

Bi-layer complex's sections from György Kurtág's *Requiem* (op. 26., 2/Larghissimo)