ANALYSIS OF THE PITCH COMPREHENSION OF SOME 20TH CENTURY TURKISH MUSIC MASTERS AND THE COMPARISON OF THE RESULTS WITH THE THEORETICAL VALUES OF TURKISH MUSIC

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ABSTRACT

There has been an absence of a theory, which establishes the performance-theory unity, among Turkish music theories. The starting point of a study that aims to eliminate the disparities between the theory and performance should be a thorough analysis of performances.

This thorough analysis of performances enables the definition of a system that meshes the theory and the performance. In this work, we study çeşnisi, the tetrachords and the pentachords that are the basis of the Turkish music maqams. We analyze the frequencies of the audio recording samples of the performers to identify the usage of çeşnisi.

The recordings used are compiled from the recordings of the performers that are passed away and the masters who have quit their active musical practices. For each performer, we analyze how çeşnisi is performed and for each çeşni we provide the average values of all performers. For each performer, we calculate the average value of a çeşni using the values from all recordings that involve this çeşni. For each çeşni, we calculate the average value from all recordings by all performers that include the given çeşni. The frequency analyses are conducted automatically.

The results of this study are shown as histograms, in Holder 1 commas, and in cents. At the end, all results are compared with the theoretical values.

1. INTRODUCTION

Although there are some studies [1,2] on the maqam theory in Turkish Music, there is an absence of a system, which is approved by all music authorities and establishes the unity between the theory and the performance. There-fore, the debates on these topics and the research attempts for such a system have not been finalized. Within the frame of these attempts, the starting point should be the thorough analysis of performances to eliminate the dis-parities between the theory and the performance. Accurate evaluation of the results of this analysis leads to a theory that has roots from the performance and enable us to describe a system that is coherent with the performance.

Tetrachords and pentachords, also called as “çeşnisi”s are the basis of maqams in Turkish Music. We can define çeşnisi as sound patterns in which the sounds between the start and end are arranged in a diatonic fashion according to an interval structure [3]. There are 15 çeşnisi described in Arel Theory, which is used today [4, 5]. Figure 1 exemplifies Hicaz çeşnisi on Đüğah (La) note and shows the distance between the pitches of the çeşnisi.

The main aim of this study is to identify how çeşnisi is used during performance and what kind of changes pitches go through under different conditions. The results of this study can be used to solve existing problems in Turkish Music theory. Thus, we can propose solutions to the basic problems in a system, such as to how many pieces an octave is divided, or if there is a need for additional signs and symbols to represent change. We can describe maqams thoroughly and preserve the traditional music and convey it to the new generations easily as a result of presenting the performance with accurate signs and symbols.

As of our best knowledge, the most comprehensive work in measurement and analysis has been done under supervision of Barış Bozkurt [6]. In this project, novel techniques are proposed for automatic music transcription and maqam detection. In both our work and this project, frequency analysis is done using Makam Toolbox developed by Barış Bozkurt [7]. Makam Toolbox uses YIN to estimate the fundamental frequency [8]. In our work, we are working in a different set of recordings.

2. METHODOLOGY

In this paper, the frequency analysis of recordings from various performers is conducted and the results are presented in comparison to the theoretical values. The recordings used are compiled from the recordings of the performers that are passed away and the masters who have quit

Figure 1: Hicaz çeşnisi. The distances among the pitches of the çeşnisi are shown in Holder coma (S: 5 commas, A12: 12 commas, T: 9 commas).

\[ \begin{array}{c|c|c|c}
S & A_{12} & S & T \\
\end{array} \]

\[ \text{Figure 1: Hicaz çeşnisi. The distances among the pitches of the çeşnisi are shown in Holder coma (S: 5 commas, A_{12}: 12 commas, T: 9 commas).} \]
their active musical practices. The used recordings are chosen from the commercial records and personal archives. In total, 416 recordings are analyzed. Table 1 presents the performers and the number of recordings analyzed from each performer.

<table>
<thead>
<tr>
<th></th>
<th>B.S Sezgin</th>
<th>İhsan Özgen</th>
<th>M.N. Selçuk</th>
<th>Necdet Yaşar</th>
<th>Niyazi Sayın</th>
<th>Cemil Bey</th>
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<tr>
<td>Segah</td>
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<td>11</td>
<td>7</td>
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<td>16</td>
<td>12</td>
<td>2</td>
<td>3</td>
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<td>90</td>
<td>78</td>
<td>35</td>
<td>17</td>
<td>24</td>
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</table>

Table 1: Number of Çęsnı Per Performer

When choosing the recordings, we deliberately tried to find the recordings that belong to the maqam, which has the same name of the çęsnı. Since the analysis is based on çęsnı, the analysis results are limited to the first five pitches to minimize the effects of the other features of the maqam to the results. For there are a limited number of recordings of the performers, we adopt two different methods for maqams for which there does not exist a recording:

1. Alternative maqams are used under the assumption that they produce similar results (Buselik-Nihavend, Çargah-Aceməşarı̈n etc.).

2. Çęsnı, for which there does not exist a recording, are searched in other recordings of the same performer. Found çęsnı samples are cut as musical sentences and then analyzed.

Since the recording of Bekir Sıtkı Sezgin and Munir Nurettin Selçuk are not solo, sections that do not include the performers are not included to the analysis. All results are shown as histograms, in Holder commas, and in cents.

Analysis is done for each performer and for each çęsnı. The results are presented here are the results of the analysis for each çęsnı. The results of the analysis is presented in comparison with the values from Arel-Ezgi-Uzdilek Theory (AEU), Töre-Karadeniz (TK) [9], and 53-TET [10] in histograms and tables (Section 3):

1. For each performer, the average values of each çęsnı performed by this particular performer are calculated. (Figure 2, Table 2)

2. For each çęsnı, the average values are calculated from the sum of all values of this particular çęsnı, performed by all performers. The results are compared with the theoretical values and the values that differ are marked. (Figure 3, Table 3)

3. RESULTS

The performance values collected from all recordings and the theoretical values of the widely used Arel-Ezgi-Uzdilek Theory are compared in Table 4. When Table 4 is studied, substantial differences between the theoretical and performance values are found for Hüseyni, Hüzzam, Saba, and Uşşak çęsnı. The values that differ from each other are underlined.

The distance between the first and the second pitches of Hüseyni çęsnı, Düğah and Segah, respectively, is measured as 6.3 comas as opposed to the theoretical value of 8 comas. The distances between the second and the third pitches, Segahandçargah, respectively, is measured as 6.4 comas as opposed to 5 comas. The distances between the third and the fourth pitches, çargah and Neva, respectively, is measured as 9.3 comas as opposed to 9 comas.

The distance between the first and the second pitches of Hüzzam çęsnı, Neva and Hisar, respectively, is measured as 6.7 comas as opposed to the theoretical value of 5 comas. The distances between the fourth and the fifth pitches, Hisar and Evıc, respectively, is measured as 10.3 comas as opposed to 12 comas.
The distance between the first and the second pitches of Saba çeşni, Düğah and Segah, respectively, is measured as 7 comas as opposed to the theoretical value of 8 comas. The distances between the second and the third pitches, Segah and çargah, respectively, is measured as 5 comas as opposed to 5.7 comas. The distances between the third and the fourth pitches, çargah and Hicaz, respectively, is measured as 6.6 comas as opposed to 5 comas.

The distance between the first and the second pitches of Uşak çeşni, Düğah and Segah, respectively, is measured as 6.7 comas as opposed to the theoretical value of 8 comas. The distances between the second and the third pitches, Segah and çargah, respectively is measured as 6.3 comas as opposed to 5 comas.

Table 3: Average Intervals in Hüzzam Çeşni Performed by All Performers

Table 4: Comparative Results.

4. CONCLUSION

When the comparison with the AEU system results are concerned, we conclude that we need some intervals and pitches that are not present in AEU system. This need is obvious for Hüseyni, Hüzzam, Saba, and Uşşak çeşnis. For the 53-TET system, since these pitches are present, the difference between the theory and the performance is the least. Even we round up the values to the next integer, its inevitable that the AUE system lacks some of the pitches and intervals.

5. REFERENCES