Sorog and Pelog Scales in the Vocal and Rebab of Sundanese Gamelan Salendro

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Abstract—This study aims to analyse and explain the unique phenomenon of Sundanese gamelan salendro performances in West Java, Indonesia, that is the fixed pitch instruments of gamelan are in the salendro scale (laras salendro), but its vocal and rebab (a two-stringed fiddle) conventionally modulate into sorog scale (laras sorog), and occasionally into pelog scale (laras pelog). The study of this phenomenon at the same time serves as a review of Kusumadinata’s scale theory which has been taught in educational institutions, stating that “sorog and pelog are the scales derived from salendro (gamelan salendro”). To analyse this phenomenon, the actual performances of various pieces of gamelan salendro, especially rebab, were examined. Based on the results of the analysis, it is explained that there are four types of sorog occur in the gamelan salendro performances; two of the four types appear most frequently, and in a long piece, three or all four types may appear. The results of this study indicate that pelog is not a scale derived from salendro, but sorog is presumed as a scale derived from salendro by this phenomenon. As to when this phenomenon took place, it would require further research with historical approaches.

Keywords: Sundanese, gamelan salendro, tone scale (laras), sorog, pelog

I. INTRODUCTION

Terminology and theories in Sundanese music are not integrated. The most likely factor is the existence of Kusumadinata’s terminology and theories. Rd. Machyar Angga Kusumadinata (1902-1979) created his own terms for the names of tones and tone scales; for example, madenda for a tone scale that was conventionally called sorog by traditional musicians in the ‘field’. He also created the solfa/cipher system for Sundanese music, i.e., da(1)-mi(2)-na(3)-ti(4)-la(5) system.

Kusumadinata’s terminology and theories have been continuously taught in educational institutions since he became the first leader of Konservatori Karawitan (KOKAR) or School of Traditional Music founded in Bandung in 1958. In fact, da-mi-na-ti-la system is still widely used in schools nowadays [1], even though it is not used at all by musicians in the ‘field’ outside the school. It can be said that Kusumadinata’s terminology and theories are influenced by Javanese music and Western music, not based on the actual practice of Sundanese music in the field. Thus, Kusumadinata’s terminology and theories have been frequently criticized, especially by foreigners such as Zanten [2,3], Fryer [4], and Weintrub [5]. Only Kunst [6] used Kusumadinata’s terminology and theory in his book which is thought to be the oldest description of Sundanese music.

Because of the use of so many terms, the tone scale system of Sundanese music seems complicated. However, it can be said that there are only three kinds of tone scales in Sundanese music, namely salendro, pelog, and sorog. All of them are pentatonic scales.

The main genre of the salendro scale in Sundanese music is the gamelan salendro. The origin of Sundanese gamelan salendro is Javanese gamelan slendro, imported from Central Java during the Mataram dynasty. The gamelan salendro develops in line with wayang golek purwa (rod puppet theatre) and various dances.

The pitch of Sundanese gamelan salendro is slightly lower than Javanese gamelan slendro, and the distance between the five tonnes in the Sundanese salendro is more even compared to that in the Javanese slendro.

Figure 1 shows names and ciphers for the tones in Sundanese gamelan salendro on the image of saron (metallophone). In Sundanese music, the tones are numbered from high to low. In parentheses are the names of the tones named by Kusumadinata. The labels on the bottom parts are the approximate tones in Western scales.

![Fig. 1. Names/ciphers/pitches in Sundanese gamelan salendro.](image)

Sundanese pelog (also called as pelog degung) is obviously pentatonic, unlike Javanese pelog which consists of seven tones (although only five of the seven tones are used in a piece). The seven-tone gamelan pelog was also imported from Central Java during the Mataram dynasty, but it did not develop much in Sunda.
Pelog is the original scale of gamelan degung (a small gamelan that is unique to Sunda) and tembang Sunda (also known as Cianjuran), a solo vocal music accompanied by zithers (kacapi) and a bamboo flute (suling). The pitch of gamelan degung is approximately 1-2-3-4-5=As-G-E'-D'-C in Western scale, meanwhile the pitch of tembang Sunda is approximately F-E-C-B'-A.

Sorog is another typical characteristic scale of Sundanese music. Many songs with sorog scale are sung in the tembang Sunda performances and also as degung kawih (gamelan degung with song). In the 1980s, many songs (kawih) were composed with sorog scale, and the most popular songs used sorog scale. Nowadays, this melancholy scale is very favoured by Sundanese people.

To change the tuning from pelog to sorog, the pitch of tone 3 of pelog is raised about a tone. To play the degung kawih with sorog scale, all instruments (keys and pots) for the tone 3 are removed and a reserve set is substituted. The pitch of sorog in tembang Sunda is approximately F-E-D-B'-A (=A'-B'-D'-E-F), meanwhile the pitch of sorog in degung kawih is approximately 1-2-3-4-5=As-G-F-D'-C (=C'-D'-F-G-A').

Regarding the three kinds of tone scales described above, Kusumadinata postulates that “pelog and sorog (which he calls madenda) are scales born out of salendro (from gamelan salendro)”. The experiments from which he derived his theory are documented in two books, Ringkasan Pangawikan Rinenggaswara [7] and Ilmu Seni Raras [8].

To see the relationship between salendro, sorog (which he terms madenda) and pelog (which he calls degung), Kusumadinata developed salendro scale into ‘rakitan salendro (salendro assembly)’ by imbedding tones in between the five salendro tones, i.e. raising or lowering the five salendro tones. First, he embedded five tones, creating “a 10-tone assembly” (the distance between the 10 notes in this model is 120 cents). Subsequently in 1942, by imbedding 10 tones, Kusumadinata made a “15-note assembly” (the distance between the 15 tones is 80 cents). Finally, he made a “17-tone assembly” by imbedding 12 tones (the distance between the 17 tones in this model is 70 cents). Through this series of experiments, Kusumadinata concluded that the “17-notes salendro assembly” is the primary tone scale of all liras (tone scale) in Sundanese music, and even the tone scales worldwide.

Kusumadinata’s scale theory (the “15-note assembly”) has been continuously taught in educational institutions. In fact, Ilmu Seni Raras is currently offered as a course in arts education institutions, such as Sekolah Tinggi Seni Indonesia (STSI) Bandung, now Institute Seni Budaya Indonesia (ISBI) Bandung (Indonesian Institute of the Arts and Culture), and Sekolah Menengah Kejuruan Negeri (State Vocational High School) 10 Bandung [9].

This Kusumadinata’s scale theory was once reviewed by Hermawan [10] and Herdini [11]. They both expressed disagreement with Kusumadinata’s scale theory; however, their research was only conducted by measuring interval (cents) externally on kacapi tuning in the tembang Sunda.
The next step was data analysis, both in the forms of information and recordings. The requirement for the recordings to be included in the data was that for one piece there should be three types of performances with different players. This requirement was meant to seek for or distinguish ‘conventional Sundanese’ from ‘personalized players’ style’. Only when similarities were found in three performances would the performances be considered ‘conventional Sundanese’ and included in the research data.

The data to be analysed in this study took the form of tones. The results of analysis were written in Sundanese numerical notations and in Western notation.

### III. RESULTS AND DISCUSSION

#### A. Four Types of System

As a result of the analysis of the phenomenon in gamelan salendro performances, four types of system are found. They are named Type A, Type B, Type C, and Type D. In Type A and B, both sorog and pelog are found, but in Type C and D, only sorog is found.

The most conventional ones are Type A and Type B. This is sensible because rebab is tuned into tone 1 and tone 4, making these tones unalterable. (In Type A and Type B, tone 1 and tone 4 are not altered).

The common system among the four types is as follows. The salendro scale of the instrument gamelan and sorog or pelog scale of the vocal and the rebab share three tones out of the five tones of the salendro scale. These three tones serve a vital role as the framework in pieces, namely for gong and kenong. These three tones function as transitional tones between the two different scales. Meanwhile, the other two tones that do not serve an important role can be ‘playful’, in which they can be raised or lowered a little, thereby modulating into sorog or pelog. Detail explanations of the four types are as follows:

1) **[Type A]**: Shared tones 1/2/4. When tone 5 and tone 3 are lowered, they modulate into sorog, but when tone 5 and tone 3 are raised, they modulate into pelog. These types of sorog and pelog are called sorog kenong and kobongan or mataraman by traditional rebab players, respectively.

| salendro: | sorog: | pelog: |
|----------|--------|--------|
| 5 4 3 2 1 5 | 5 4 3 2 1 5 | 5 4 3 2 1 5 |

**Salendro**: 4-3-2-1-5-4 = D-E'-G-A-B'/C'-D  
**Sorog**: 4-3-2-1-5-4 = D-E³-G-A-B³-D  
**Pelog**: 4-3-2-1-5-4 = D-F⁵-G-A-C⁵-D

2) **[Type B]**: Shared tones 1/3/4. When tone 5 and tone 2 are lowered, they modulate into sorog, but when tone 5 and tone 2 are raised, they modulate into pelog. These types of sorog and pelog are called sorog panelu and pelog degung by traditional rebab players, respectively.

| salendro: | sorog: | pelog: |
|----------|--------|--------|
| 5 4 3 2 1 5 | 5 4 3 2 1 5 | 5 4 3 2 1 5 |

**Salendro**: 4-3-2-1-5-4 = D-E'-G-A-B'/C'-D  
**Sorog**: 4-3-2-1-5-4 = D-E³-G-A-B³-D  
**Pelog**: 4-3-2-1-5-4 = D-F⁵-G-A-C⁵-D

3) **[Type C]**: Shared tones 1/3/5. When tone 2 and tone 4 are lowered, they modulate into sorog. This type of sorog called sorog singgul by traditional rebab players.

| salendro: | sorog: |
|----------|--------|
| 5 4 3 2 1 5 | 5 4 3 2 1 5 |

**Salendro**: 5-4-3-2-1-5 = B'/C'-D- E'-G-A- B'/C'  
**Sorog**: 5-4-3-2-1-5 = B'-C- E'-F-A-B'- (= E-F-A-B-C-E)

4) **[Type D]**: Shared tones 2/4/5. When tone 1 and tone 3 are lowered, they modulate into sorog. This type of sorog is unnamed.

| salendro: | sorog: |
|----------|--------|
| 5 4 3 2 1 5 | 5 4 3 2 1 5 |

**Salendro**: 5-4-3-2-1-5 = B'/C'-D- E'-G-A- B'/C'  
**Sorog**: 5-4-3-2-1-5 = C'-D-E³-G-A³-C'- (= G-A'-C-D-E-G)

#### B. ‘Salendro with Pelog’

Based on the results of analysis, it can be said that theoretically both sorog and pelog can be derived from salendro in the performances of gamelan salendro.

However, in reality the form of ‘salendro with pelog’ is a rare case. There are also no classical pieces found whose original melody has a pelog scale. The form of ‘salendro with pelog’ is only found in new compositions or as a variation in the performances of pieces whose original melody has a salendro scale. Therefore, it can be assumed that the form of ‘salendro with pelog’ is a new phenomenon.

#### C. ‘Salendro with Sorog’

The form conventionally found is ‘salendro with sorog’. There are also many classical pieces whose original melody has a sorog scale, such as Kulu-Kulu Bem, Tablo, Udan Mas, and Banjar Sinom.

It cannot be ascertained since when these pieces have existed; however, according to Lubis [15], successive regents (bupati) of Cianjur preferred to use Kulu-Kulu Bem for accompanying tabuh (aristocratic men's dance). Hence, it can be considered that these pieces have already existed in the 19th century. Therefore, it can be deduced that the form of ‘salendro with sorog’ is an old phenomenon.
D. Explanations of the Four Types of Sorog

Figure 2 shows all four types of sorog explained above. It is transcribed by the first author in the approximate tones in Western scales.

As previously explained, the most conventional ones are Type A and Type B. In addition, as for sorog, the combination of Type A and Type B is common. Type C is only found in combination with Type B. Whereas, Type D is only found in combination with Type A and appears only when heading to tone 4.

In case of combination, the movements from Type A to Type B (or vice versa), from Type A to Type D (or vice versa), and from Type B to Type C (or vice versa) frequently occur. However, the movements from Type A to Type C (or vice versa) and from Type B to Type D do not occur.

For a concrete example, the classical piece (whose original melody has a sorog scale) Kulu-Kulu Bem is a combination of Type A and Type B. The classical pieces (whose original melody have a sorog scale) Tablo and Udan Mas are combinations of Type A, Type B and Type D. The classical piece (whose original melody has a sorog scale) Banjar Sinom is a combination of Type B and Type C.

The classical piece Kawitan played in the opening of wayang golek purwa is originally in salendro scale, but conventionally it is altered into sorog. In this piece, all four types of sorog are found.

The pieces that were originally repertoire of gamelan salendro, such as Kulu-Kulu Bem and Tablo, are often sung as the repertoire of the salendro scale in tembang Sunda performances, in which kacapi (zither) is tuned in the salendro scale. (In the repertoire of salendro scale, rebab is used instead of rebab.) Thus, these four types of sorog are also found in the tembang Sunda performances.

IV. Conclusion

As previously explained, it can be assumed that the form of salendro with pelog in the performance of gamelan salendro is a recent phenomenon. Hence, pelog cannot be considered a scale derived from salendro (gamelan salendro).

Meanwhile, the form of salendro with sorog in the performances of gamelan salendro is estimated to be an old phenomenon. Therefore, it can be presumed that sorog is a scale derived from salendro (gamelan salendro). As for when exactly this phenomenon took place and what triggered, it would require further research with historical approaches.

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