

# 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 Weintraub [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 tones 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.

5 singgul	4 bem (galimer)	3 panelu	2 kenong (loloran)	1 barang (tugu)	5 singgul (petit)
B $\uparrow$ / C $\downarrow$	D	E $\uparrow$	G $\downarrow$	A	B $\uparrow$ / C $\downarrow$

Fig. 1. Names/ciphers/pitches in Sundanese gamelan *salendro*.

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=A<sup>b</sup>-G-E<sup>b</sup>-D<sup>b</sup>-C in Western scale, meanwhile the pitch of *tembang Sunda* is approximately F-E-C-B<sup>b</sup>-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<sup>b</sup>-A (=A-B<sup>b</sup>-D-E-F), meanwhile the pitch of *sorog* in *degung kawih* is approximately 1-2-3-4-5=A<sup>b</sup>-G-F-D<sup>b</sup>-C (=C-D<sup>b</sup>-F-G-A<sup>b</sup>).

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, *Ringkesan 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 *laras* (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*.

As argued by Koizumi [12], research on tuning in instruments by measuring cents mathematically is meaningless when the musical structure is unknown. Therefore, what is needed is an internal analysis of the musical structure of *gamelan salendro* performances.

In order to know the musical structure, it is necessary to take into account the characteristics of the *gamelan salendro*. One of the characteristics of Sundanese *gamelan salendro* performances is the domination of vocal. It can be said that gamelan serves as accompaniment. In other words, the performance of *gamelan salendro* consists of two parts, namely melody played by vocal and *rebab*, and gamelan as accompaniment.

Concerning this feature, there is an interesting phenomenon, that is the fixed pitch instruments of gamelan are in the *salendro* scale, but its vocal and *rebab* often modulate into *sorog* scale or *pelog* scale.

This phenomenon is unique to Sundanese music, and yet little attention has been paid to it so far by the Sundanese themselves. Recently, only Saepudin [13] studied this phenomenon, but his discussion is totally based on Kusumadinata’s terminology and theories.

The first author has also studied this phenomenon [14]; however, the study was not complete. In this paper, this phenomenon is analysed and explained in more detail. At the same time, this study serves as a review on whether or not *pelog* and *sorog* are scales derived from *salendro* (from *gamelan salendro*).

## II. RESEARCH METHOD

This research uses a qualitative paradigm by engaging analytical descriptive method. The first author collected two types of data. First, the knowledge obtained through practicing *gamelan salendro*, especially *rebab*. The second set of data was in the form of recordings of *gamelan salendro* pieces.

To gain the general knowledge about the practice of *gamelan salendro*, the first author has taken the courses of “the practice of *gamelan salendro/pelog*” and “*wayang golek purwa* accompaniment” at STSI Bandung.

In addition, the first author took lessons from experts (traditional musicians) of *gamelan salendro* in the ‘field’, among others: Entis Sutisna (1922-2001), Tosin Muhtar (1943-2000), Samin Batu (1935-2004), Ade Komara (1952-), Asep Mulyana (1955-).

To understand the concept of tone scales (*laras*), the first author studied *rebab* from Uloh Abdullah (1956-2013) who is an instrumental figure in *rebab*, appropriate to be regarded as a key informant. *Rebab* is important because all tones can be clearly seen in the position of the fingers.

In addition, a large number of recordings were collected, both commercial cassettes or CDs and personal recordings. To record the performances of *gamelan salendro*, the first author frequently attended *wayang golek purwa*.

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 follow. 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* tones. 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.

<i>salendro:</i>	5	4	3	2	1	5	
<i>sorog:</i>	5	4	3	2	1	5	
<i>pelog:</i>		5	4	3	2	1	5

*Salendro:* 4-3-2-1-5-4 = D-E<sup>1</sup>-G-A-B<sup>1</sup>/C<sup>1</sup>-D

*Sorog:* 4-3-2-1-5-4 = D-E<sup>b</sup>-G-A-B<sup>b</sup>-D

*Pelog:* 4-3-2-1-5-4 = D-F<sup>#</sup>-G-A-C<sup>#</sup>-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.

<i>salendro:</i>	5	4	3	2	1	5	
<i>sorog:</i>	5	4	3	2	1	5	
<i>pelog:</i>		5	4	3	2	1	5

*Salendro:* 4-3-2-1-5-4 = D-E<sup>1</sup>-G-A-B<sup>1</sup>/C<sup>1</sup>-D

*Sorog:* 4-3-2-1-5-4 = D-E<sup>1</sup>-F-A-B<sup>b</sup>-D (= A-B<sup>b</sup>-D-E-F-A)

*Pelog:* 4-3-2-1-5-4 = D-E<sup>1</sup>-G<sup>#</sup>-A-C<sup>#</sup>-D (= A-C<sup>#</sup>-D-E-G<sup>#</sup>-A)

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 tunggal* by traditional *rebab* players.

<i>salendro:</i>	5	4	3	2	1	5
<i>sorog:</i>	5	4	3	2	1	5

*Salendro:* 5-4-3-2-1-5 = B<sup>1</sup>/C<sup>1</sup>-D- E<sup>1</sup>-G-A- B<sup>1</sup>/C<sup>1</sup>

*Sorog:* 5-4-3-2-1-5 = B<sup>1</sup>-C- E<sup>1</sup>-F-A-B<sup>1</sup> (= 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.

<i>salendro:</i>	5	4	3	2	1	5
<i>sorog:</i>	5	4	3	2	1	5

*Salendro:* 5-4-3-2-1-5 = B<sup>1</sup>/C<sup>1</sup>-D- E<sup>1</sup>-G-A- B<sup>1</sup>/C<sup>1</sup>

*Sorog:* 5-4-3-2-1-5 = C<sup>1</sup>-D-E<sup>b</sup>-G-A<sup>b</sup>-C<sup>1</sup> (= G-A<sup>b</sup>-C-D-E<sup>b</sup>-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 *tayub* (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.

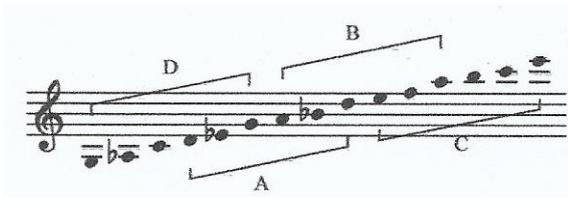


Fig. 2. All four types of *sorog* occur in the vocal and *rebab* in the Sundanese *gamelan salendro* performances transcribed by Mariko Sasaki.

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 D. 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 *suling*.) 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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