



The Presence of Shadow and Mathematical Sequence in Abelardo's "Kung Hindi Man"

Saul M. Muyco, PhD

¹ Iloilo Science and Technology University, Iloilo City, Philippines

Email: ¹ saul.muyco@isatu.edu.ph

Abstract

The Philippines' kundiman, titled "Kung Hindi Man" by National Artist Nicanor Abelardo, is an exciting composition that provides for a challenging mathematical analysis in terms of a set of note series and the formation of "shadow", a term that I used to refer to the repetition of musical phrases in modified versions of itself, either as a form of response or an emphasis of an ideational or emotional point. Musically, terms such as "antecedent and consequent" comprise a period. However, I found additional material that follows these phrases, particularly in the kundiman mentioned above that I interpret as a "shadow". Interpretations can be subjective and relative, but specific objective analyses can be made with a mathematical "set" (Bagaria, 2023) or a collection of elements in a sequence. I use this analysis to draw out the effect of a sequence, e.g., notes in ascending or descending fashion, thereby providing another interpretation besides a mathematical structure. In his book "Sound and Sentiment" (2012, 3rd ed.), anthropologist Steven Feld explains that the shape of pitch motives can evoke a particular emotion. This emotion can be an effect brought about by the inharmonic chords and notes in the sequence. In this study, I examine musical notes in their mathematical and affective value, making Applied Mathematics more understandable in its inclusion of experience, association, and expression.

Keywords: Shadow, sequence, inharmonic chords and notes.

1. Introduction

The richness of our culture defines us. We walk in this world carrying technologies and practices developed by our ancestors, which is a privilege and a responsibility. We should revisit our cultural heritage and move from mere preservation to finding its essence in our lives. That is the goal of Applied Mathematics: to provide solutions to problems or challenging situations in any field of life using the technical knowledge and practice of mathematics (Werner et al., 1991). We move forward by knowing what we have, making these part of our practices in the environment and teaching these with enhancement so that these may be taken to the next generation with pride and dignity, aside from this cultural benefit, when we learn lessons from the songs of the past.

One of the rich cultures we inherited is the kundiman song "Kung Hindi Man", composed by Nicanor Abelardo. I analysed this composition through the notes in every measure and will explain the mathematical value of these notes as they are grouped into a set. The mathematical analysis of this song will involve notes in a sequence and the harmony these notes will form, which in laymen's terms is called "chords."

2. Literature Review

The following are key concepts in this study. They are discussed briefly to gain a shared understanding of what is being meant in the analysis of this study.

2.1. Keys, chords, and notes

In music, a letter name can represent a key, a chord, or a note. On the piano's white notes, these chords are formed C, D, E, F, G, A, and B; and on black: C*, D*, F*, G*, and A*. On a piano, every note determines a unit of sound. Each note has a half-note distance from the other. The root or the tonic is a major; the super tonic is a minor; the mediant is a minor; the sub-dominant is a major; the dominant is a major; the sub-mediant is a minor; and the diminished.

Once the centre tone is established on a scale, the concept of a "key", marked by a key signature (or without), applies. Ideally, keys are categorised under the major or minor mode (Martin, 2023).

2.2. Bending sound, shifting sound, posture sound

The term bending sound is used in this study to mean the sliding of a regular chord or member/note to an irregular one and, simultaneously, producing a harmonic sound, though in a bizarre way. The shifting sound is used to mean a stepping chord towards another. The posture sound is a substitution of a chord to minor or major to change the posture as either emotional or straight.

2.3. Antecedent and consequent

Songs deliver a message. The message is gradually being built up and expressed using statements and justifications. These two concepts are more popularly known as antecedent and consequent.

2.4. Semi-colon

The semi-colon is being used in the sequence. It is used to separate chords. A semi-colon in the sequence indicates that another chord will be played afterwards. Semi-colon separates the melody by chord.

2.5. The letters C, C*, D, D*, E, F, F*, G, G*, A, A*, B

The letters C, C*, D, D*, E, F, F*, G, G*, A, A*, and B represent the musical notes do, do-sharp, re-re-sharp, mi, fa, fa-sharp, so, so-sharp, la, la-sharp and ti. Expressing the musical note in a letter is necessary to make it simpler and easier to identify its rank.

2.6. The Numbers 1, 2, 3, 4, 5, 6, and 7

A number indicates the rank of the note concerning its chord. As the used notes are selected further to the right or the left, the same set of numbers is used though it changes in pitch. More than one digit number does not indicate the usual integer number but instead means merging note ranks. Thus 53 under Gm means D and Bb notes played together.

2.7. The symbol "0, -, and +."

These three symbols are used to show direction. (0) means the initial position or there is no change in direction, (-) means it is going to the left, and (+) means it is going to the right.

2.8. The symbol "0" in the sequence of letters

The symbol "0" in the sequence of letters indicates rest. When it corresponds to the first voice, it means no note is paired with it.

2.8. Standing, augmented and running shadows

A shadow in this study is a sequence of notes other than the first voice. "Standing" refers to the sequence played together with the first voice. It is shown in the bass. "Augmented" refers to the following sequence after the first voice. Furthermore, the term "running" is a sequence played after the first voice in the bass.

2.9. The superscript "-and "+"

Numbers represent the rank of the notes concerning the chord. A superscript is written after the number indicates either flat or sharp. (-) means flat of the note, and (+) means sharp. It also indicates that the note differs from the chord's expected notes.

2.10. The superscript *

The superscript * is used to mean sharp. It is used in place of the symbol # for convenience in encoding.

3. Conceptual Paradigm

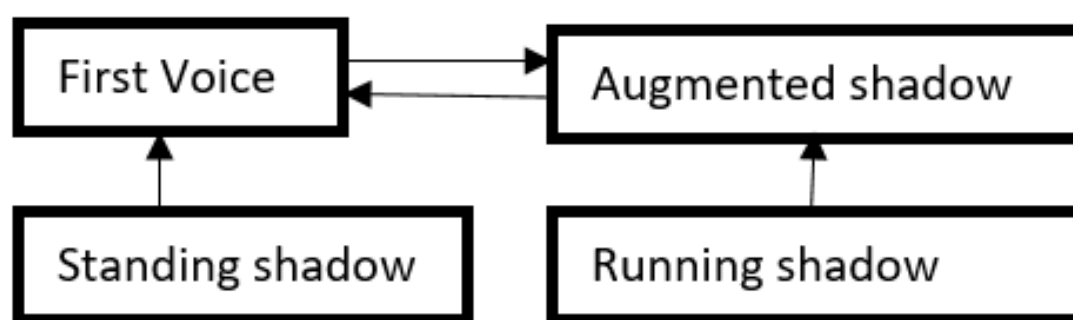


Figure 2. The relationship of the first voice, standing shadow, augmented shadow and running shadow

The diagram shows the relationship between the first voice, the standing shadow, the augmented shadow and the running shadow. The standing shadow supports the first voice by giving dimension to it. It acts as bass to it. The augmented shadow is what follows after the first voice. The first voice can be in the form of antecedent or consequent. The augmented shadow supports the first voice by providing an echo effect to the first voice. The running shadow supports the first voice by giving dimension to the augmented shadow. It acts as the bass of the augmented shadow.

4. Objectives of the Study

This study aims to analyse the song "Kung Hindi Man" using sequence and shadows.

Specifically, it aims to:

1. Identify notes and chords in a progression using sequence;
2. Identify the presence of shadow and its position relative to the antecedent and consequent of the song;
3. Explain the occurrence of the shadows and why it makes an impact on the music;
4. Explain the occurrence of the inharmonic notes and chords and why these make a unique impact on the song

5. Methodology

This study uses the method of set identity in analysing the "shadow". Using a mathematical "set" (Bagaria: 2023), or a collection of elements in a series, entails identification, codification, groupings, and analysis. I use this analysis to draw out the effect of a series,

e.g., notes in ascending or descending fashion, thereby providing another interpretation besides a mathematical structure.

In detail, I will undergo the following procedure:

1. Identify the chords of the song through notes in a measure.
2. Represent the chords and notes in terms of number coding.
3. Breakdown the parts of the song in terms of antecedent and consequence;
4. Identify the presence of shadow and its position relative to the antecedent and consequent of the song;
5. Identify the chord progressions and represent them in the form of sequence;
6. Identify the note progression and represent it in the form of sequence;
7. Identify unusual notes and chords in the progression using sequence.

5.1. Research design

The research design includes expressing the notes shown in the score sheet in letter form and then identifying the chords based on the notes at the strategic positions in the measures. Break down the lyrics according to antecedent and consequent. Write the chords and notes associated with the lyrics, and express the notes in letter form in rank form. Identify the inharmonic chords and notes from the sequences. Then explain the reason for their existence and their purpose in the music.

5.2. Subject of the Study

The subject of the study is the Kundiman musical piece composed by Nicanor Abelardo entitled "Kung Hindi Man". This subject is a Filipino piece worth analysing because of its unique chord combination, which touches the emotion of the listeners.

The "Kung Hindi Man" piece.

KUNG HINDI MAN

Titik at Tugtugin ni
NICANOR ABELARDO

PIANO

dolce

allargando

I-rog sandaling dinggin Ang a king pagta-ñgis I-rog sandaling tunggan

p

Ang hu-mi- hi- bik — Kung di man na-ra-rapat Sa i-yong di-
 kit — Isang sulyap mo la- mang A- liw na ng dib- dib.
 2. *Coro*
 I-rog sando dib. Kung sa'kiy wa- la nang I- ni- laang pag-
 li- ngap At ang pagdu- ru- sa ko Ang siya, mong paingarap Sa isang iigi-
 li mong Sa a-kiy i- ga- wad Libo mang kamalayan Aking li- na- lang
 gap. — Kung sa'kiy wa- king li- ng- langgap.
 2.

Figure 2. The manuscript of "Kung Hindi Man."
 (Source: The Library of UP College of Music Diliman).

5.3. Data Analysis

The notes from the score sheet were expressed in letter form and then reencoded in tabular form to analyse the kundiman. The notes, written initially in horizontal format, were rewritten vertically. They are then broken down as antecedent and consequent and placed on a table. These notes in letter form are expressed in rank form. Identifying them as inharmonic chords and notes in rank form is possible. The Kundiman piece was also written in the form of lyrics with chords. The chords, evident to be inharmonic, were analysed in the context of the song, why it was included, and justified why they are part of it.

6. Presentation

Below is a table that connects the chords to their notes. The letters in the column at the left represent the chords, and the letter in the row at the top is the notes. The row aligned to the letter in the first column shows its note members. The blank spaces indicate that the notes at the first column aligned to it are not part of a chord. Numbers 1 to 7 are members of the chord. It has a particular role in music.

Table 1. The major chords and their notes

| NOTES | | G | G* | A | A* | B | C | C* | D | D* | E | F | F* |
|--------|----|---|----|---|----|---|---|----|---|----|---|---|----|
| CHORDS | G | 1 | | 2 | | 3 | 4 | | 5 | | 6 | | 7 |
| | G* | 7 | 1 | | 2 | | 3 | 4 | | 5 | | 6 | |
| | A | | 7 | 1 | | 2 | | 3 | 4 | | 5 | | 6 |
| | A* | 6 | | 7 | 1 | | 2 | | 3 | 4 | | 5 | |
| | B | | 6 | | 7 | 1 | | 2 | | 3 | 4 | | 5 |
| | C | 5 | | 6 | | 7 | 1 | | 2 | | 3 | 4 | |
| | C* | | 5 | | 6 | | 7 | 1 | | 2 | | 3 | 4 |
| | D | 4 | | 5 | | 6 | | 7 | 1 | | 2 | | 3 |
| | D* | 3 | 4 | | 5 | | 6 | | 7 | 1 | | 2 | |
| | E | | 3 | 4 | | 5 | | 6 | | 7 | 1 | | 2 |
| | F | 2 | | 3 | 4 | | 5 | | 6 | | 7 | 1 | |
| | F* | | 2 | | 3 | 4 | | 5 | | 6 | | 7 | 1 |

A particular rule identifies the rank of the notes of each chord. These rules ensure the harmony of each note played with the other notes and the entire music. Its first member is on the first note; the second is on the 3rd half note; the third is on the 5th half note; the 4th on the 6th half note; the 5th on the 8th half note, the 6th on the 10th half note, and the 7th on the 12th half note.

Table 1.1. Member's selection for the major chords

| | Rank of Notes | | | | | | |
|---------------|---------------|-----|-----|-----|-----|------|------|
| Half Notes | 1st | 3rd | 5th | 6th | 8th | 10th | 12th |
| Chord Members | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th |

Table 2. The minor chords and their notes

NOTES

| | G | G* | A | A* | B | C | C* | D | D* | E | F | F* | |
|--------|-----|----|---|----|---|---|----|---|----|---|---|----|--|
| CHORDS | Gm | 1 | 2 | 3 | | 4 | | 5 | | 6 | 7 | | |
| | G*m | | 1 | 2 | 3 | | 4 | | 5 | | 6 | 7 | |
| | Am | 7 | | 1 | 2 | 3 | | 4 | | 5 | | 6 | |
| | A*m | 6 | 7 | | 1 | 2 | 3 | | 4 | | 5 | | |
| | Bm | | 6 | 7 | | 1 | 2 | 3 | | 4 | | 5 | |
| | Cm | 5 | | 6 | 7 | | 1 | 2 | 3 | | 4 | | |
| | C*m | | 5 | | 6 | 7 | | 1 | 2 | 3 | | 4 | |
| | Dm | 4 | | 5 | | 6 | 7 | | 1 | | 2 | 3 | |
| | D*m | | 4 | | 5 | 6 | 7 | | 1 | | 2 | 3 | |
| | Em | 3 | | 4 | | 5 | 6 | 7 | | 1 | | 2 | |
| | Fm | 2 | 3 | | 4 | | 5 | 6 | 7 | | 1 | | |
| | F*m | | 2 | 3 | | 4 | 5 | | 6 | 7 | | 1 | |

The rank of the notes of each chord is determined by a different rule when it is a minor. Its first member is on the first note; the second is on the 4th half note; the third is on the 5th half note; the 4th on the 6th half note; the 5th on the 8th half note, the 6th on the 10th half note, and the 7th on the 11th half note.

Table 2.1. Member's selection for the minor chords

| | Rank of Notes | | | | | | |
|---------------|---------------|-----|-----|-----|-----|------|------|
| Half Notes | 1st | 3rd | 4th | 6th | 8th | 10th | 11th |
| Chord Members | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th |

Table 3. The diminished chords and their notes

NOTES

| | G | G* | A | A* | B | C | C* | D | D* | E | F | F* | |
|--------|-------|----|---|----|---|---|----|---|----|---|---|----|---|
| CHORDS | Gdim | 1 | 2 | 3 | | 4 | 5 | | 6 | 7 | | | |
| | G*dim | | 1 | 2 | 3 | | 4 | 5 | | 6 | 7 | | |
| | Adim | | | 1 | 2 | 3 | | 4 | 5 | | 6 | 7 | |
| | A*dim | 7 | | | 1 | 2 | 3 | | 4 | 5 | | 6 | |
| | Bdim | | 7 | | | 1 | 2 | 3 | | 4 | 5 | | |
| | Cdim | | 6 | 7 | | | 1 | 2 | 3 | | 4 | 5 | |
| | C*dim | 5 | | 6 | 7 | | | 1 | 2 | 3 | | 4 | |
| | Ddim | 4 | 5 | | 6 | 7 | | | 1 | | 2 | 3 | |
| | D*dim | | 4 | 5 | | 6 | 7 | | | 1 | | 2 | 3 |
| | Edim | | | 4 | 5 | | 6 | 7 | | | 1 | | 2 |
| | Fdim | 2 | 3 | | 4 | 5 | | 6 | 7 | | | 1 | |
| | F*dim | | 2 | 3 | | 4 | 5 | | 6 | 7 | | | 1 |

The rank of the notes of each diminished chord is determined by a minor third, flat fifth, flat sixth and a double flat seventh. Its first member is on the first note; the second is on the 3rd

half note; the third is on the 4th half note; the 4th on the 6th half note; the 5th on the 8th half note; the 6th on the 9th half note, and the 7th on the 11th half note.

Table 3.1. Members' selection for the diminished chords

| | Rank of Notes | | | | | | |
|---------------|---------------|-----|-----|-----|-----|-----|------|
| Half Notes | 1st | 3rd | 4th | 6th | 7th | 9th | 10th |
| Chord Members | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th |

Below is the classification of the member of each key. M indicates that the member is a major, m that it is a minor, and d when it is a diminished

Table 4. The classification of chords in a major key

CLASSIFICATION (Major, minor, diminished)

| | G | G* | A | A* | B | C | C* | D | D* | E | F | F* |
|----|---|----|---|----|---|---|----|---|----|---|---|----|
| G | M | | m | | m | M | | M | | m | | d |
| G* | d | M | | m | | M | M | | M | | m | |
| A | | d | M | | m | | M | M | | M | | m |
| A* | m | | d | M | | m | | M | M | | M | |
| B | | m | | d | M | | m | | M | M | | M |
| C | M | | m | | d | M | | m | | m | M | |
| C* | | M | | m | | d | M | | m | | m | M |
| D | M | | M | | m | | d | M | | m | | m |
| D* | m | M | | M | | m | | d | M | | m | |
| E | | m | M | | M | | m | | d | M | | m |
| F | m | | m | M | | M | | m | | d | M | |
| F* | | m | | m | M | | M | | m | | d | M |

Members of the key of G: G, Am, Bm, C, D, Em, F*dim

Table 5. The classification of chords in a minor key

CLASSIFICATION (Major, minor, diminished)

| | G | G* | A | A* | B | C | C* | D | D* | E | F | F* |
|-----|---|----|---|----|---|---|----|---|----|---|---|----|
| Gm | m | | d | M | | m | | m | M | | M | |
| G*m | | m | | d | M | | m | | m | M | | M |
| Am | M | | m | | d | M | | m | | m | M | |
| A*m | | M | | m | | d | M | | m | | m | M |
| Bm | M | | M | | m | | d | M | | m | | m |
| Cm | m | M | | M | | m | | d | M | | m | |
| C*m | | m | M | | M | | m | | d | M | | m |
| Dm | m | | m | M | | M | | m | | d | M | |
| D*m | | m | | m | M | | M | | m | | d | M |
| Em | M | | m | | m | M | | M | | m | | d |
| Fm | d | M | | m | | m | M | | M | | m | |
| F*m | | d | M | | m | | m | M | | M | | m |

As shown in the table above, the chord belonging to Gm is identified. Members of the key of Gm are Gm, Adim, A*, Cm, Dm, D*, F. The selected chords and notes belonging to the Gm key have the following notes for each chord member.

Table 6. Notes of the chords of Gm

NOTES

| | | G | G* | A | A* | B | C | C* | D | D* | E | F | F* |
|-------|----|---|----|---|----|---|---|----|---|----|---|---|----|
| MAJOR | D* | 3 | 4 | | 5 | | 6 | | 7 | 1 | | 2 | |
| | F | 2 | | 3 | 4 | | 5 | | 6 | | 7 | 1 | |
| | A* | 6 | | 7 | 1 | | 2 | | 3 | 4 | | 5 | |

Table 6.1. Notes of the minor chords of Gm

NOTES

| | | G | G* | A | A* | B | C | C* | D | D* | E | F | F* |
|-------|----|---|----|---|----|---|---|----|---|----|---|---|----|
| MINOR | Cm | 5 | 6 | | 7 | | 1 | | 2 | 3 | | 4 | |
| | Dm | 4 | | 5 | 6 | | 7 | | 1 | | 2 | 3 | |
| | Gm | 1 | | 2 | 3 | | 4 | | 5 | 6 | | 7 | |

Table 6.2. Notes of the diminished chords of Gm

NOTES

| | | G | G* | A | A* | B | C | C* | D | D* | E | F | F* |
|--|------|---|----|---|----|---|---|----|---|----|---|---|----|
| | Adim | | | 1 | | 2 | 3 | | 4 | 5 | | 6 | 7 |

The table above shows that C*, E, F*, G* and B are not part of the family. Their presence in the song will create disharmony to the song.

Members of the key of G: G, Am, Bm, C, D, Em, F*dim. The selected chords and notes belonging to the G key have the following notes for each chord member.

Table 6.3. Notes of the chords of G major

NOTES

| | | G | G* | A | A* | B | C | C* | D | D* | E | F | F* |
|-------|---|---|----|---|----|---|---|----|---|----|---|---|----|
| MAJOR | G | 1 | | 2 | | 3 | 4 | | 5 | | 6 | | 7 |
| | C | 5 | | 6 | | 7 | 1 | | 2 | | 3 | 4 | |
| | D | 4 | | 5 | | 6 | | 7 | 1 | | 2 | | 3 |

Table 6.4. Notes of the minor chords of G major

NOTES

| | | G | G* | A | A* | B | C | C* | D | D* | E | F | F* |
|-------|----|---|----|---|----|---|---|----|---|----|---|---|----|
| MINOR | Am | 7 | | 1 | | 2 | 3 | | 4 | | 5 | 6 | |
| | Bm | 6 | | 7 | | 1 | | 2 | 3 | | 4 | | 5 |
| | Em | 3 | | 4 | | 5 | 6 | | 7 | | 1 | | 2 |

Table 6.5. Notes of the diminished chords of G major

NOTES

| | | G | G* | A | A* | B | C | C* | D | D* | E | F | F* |
|--|-------|---|----|---|----|---|---|----|---|----|---|---|----|
| | F*dim | | 2 | 3 | | 4 | 5 | | 6 | 7 | | | 1 |

The table above shows that G*, A*, C*, and F are not in the G essential family. Their presence in the song will presumably create inharmonic effects.

Identified chords based on measures and notes

The figure below shows that the song is grouped into the verse and the refrain. It also shows the two sets of chords assigned. In the verse, the set of chords is that of Gm, while in the refrain, G.

The set consists of chords found in the piece. Such chords are:

Verse: Gm, D, Adim, Bdim, Cm, G

Refrain: G, D, Am, Bdim, E, Cm, G

The bass identified the key of the song at the beginning and the end of the song. The type of chord, minor shifting to the principal, was recognised through the notes in the song's measure.

Kung Hindi Man

Intro: Gm Cm Am Gm/D Gm Cm/Eb Daug Gm Gm/D Gm/Bb Gm

D Gm Gm/D Gm/Bb Gm/D Gm D
 Irog sandaling dinggin ang aking pagtangis
 D D7 Bdim D Adim/G Gm
 Irog sandaling tunghan ang humihibik
 G Bdim G D7 G Cm
 Kung 'di man nararapat sa iyong dikit
 Cm Gm/D D/Eb D7 Gm
 Isang sulyap mo lamang, Aliw na ng dibdib.

G-Gm-G G G/D D
 Kung saki'y wala nang inilaang paglingap
 D D7 Am D Gm-G
 At ang pagdurusa ko ang siya mong pangarap
 Bdim-E E7. Am
 Sa isang ngi-ti mong sa aki'y igawad
 Cm G/D Am D G
 Libo mang kamatayan aking tinatanggap.

Figure 3. Identified chords of "Kung Hindi Man"

Identifying the chords in the song enables us, by ocular inspection, to identify the inharmonic chords present in the verse and the refrain.

Below are the table of regular chords for Gm and G and what is found in the song. The chords recognised as inharmonic are those different from those found in the table and are the subject of analysis as to why the composer uses them and why they sound uniquely well with the song.

Table 7. Chords of the verse

| CHORDS | | | | | | | |
|---------|----|------|----|----|----|----|---|
| REGULAR | Gm | Adim | Bb | Cm | Dm | Eb | F |
| ACTUAL | Gm | Adim | | Cm | | | |

The inharmonic chords are G*dim, Bdim, G, D

Table 7.1. Chords of the refrain

| CHORDS | | | | | | | |
|---------|---|----|----|---|---|----|-------|
| REGULAR | G | Am | Bm | C | D | Em | F*dim |
| ACTUAL | G | Am | | | D | | |

The inharmonic chords are Bdim, E, Gm, and Cm.

Notes of the piece are expressed in letters and measures transposed vertically.

| BASS | G CLEFF | BASS | G CLEFF | BASS | G CLEFF | BASS | G CLEFF | BASS | G CLEFF | BASS | G CLEFF |
|-------------------------|------------------------------------|-------------------------------------|----------------------------|-------------------------------------|---------------------------------------|---------------------------------|---------------------------|--------------------------------|--|----------------------------------|--|
| M1 Bb A G | DG DGA DGBb | M9 D DD D* D C* | GBb F*A | M17 C G Ab G F* G | FGD EbGC | M24 BG | G BD BD A*D E | M32 D G G F B | BD BD BD F | M40 D D | F*CD CD D D E |
| Repeat refrain | | | | | | | | | | | |
| M2 C A Bb C | EbGD C EbGC EbGBb EbGA | M10 C | D D* D C* | M18 C A Bb C | EbGC EbGD EbGC EbGBb EbGA | Refrain | | M33 EB D* E F E | G*DF E DEB | M41 A A AEG DA GG | BDFG* A GAE F*ACD GBDG C* D G B F* G B D A* B D |
| M3 D G A Bb | DGC Bb DBb DA DG | M11 D DC Eb D C | D F* A | M19 DD DG Bb | DGBb AC BbD F Eb DG | M26 G DB GD DD | GB BD AC GB | M34 E EG*D E | FG*D FG*D EG*C EG*B | DD BbbB | |
| M4 Eb D | DbA Ab A CF*Bb | M12 B C D D | FG* DF*A DF*AD A | M20 Eb DD | A Db G* CF*A Bb | M27 DD DD E F* A | AC GB F*A | M35 A D* E A C | FG*D EAC | | |
| M5 GG DD BbBb | BbG D DBb G GD Bb | M13 G C* D F* A G | EbF*C DGBb | M21 GG DD BbBb | BbG D DBb G GD Bb | M28 D | AC GB F*A EG | M36 CC CGA CEbGA | EbA B EbGC EbGACE b EbA | M42 GG G | GADG G |
| M6 GG | GBbDG D D* D C* | M14 Bb B C B Ab | DFG DFAb DFG CDF* | M22 GG | GBbDG D Eb D C* | M29 D DC G* B A | DF* A G F* | M37 DD DGB DEGD | DG A DGB DGBD DB | | |
| Verse | | Repeat verse | | | | | | | | | |
| M7 G DG | D G DBb | M15 GG GG | BDG B FGD | M23 G | G C* D | M30 A EAC | EC CE | M38 AEG DG | CEA C ACE | | |

| | | | | | | | | | | | |
|-----|-----|-----|-----|----|----|-----|-----|-----|-------|--|--|
| D | | A | | DB | G | DD | EG | DA | CDF* | | |
| C | | B | | | GD | B | | DF* | | | |
| Bb | | C | | | | F* | | | | | |
| M8 | | M16 | | | G | M31 | | M39 | | | |
| BbG | DG | G | DB | | B | G | C*E | GD | BDG | | |
| DBb | | B | G | | D | C* | | C* | GBbC* | | |
| | F*A | Ab | GbC | | A* | D | BD | D | GBD | | |
| GD | GBb | GG | FD | | B | F* | | F* | GBF* | | |
| | AC | G | GEb | | D | E | | E | GBE | | |
| | | | | | | Eb | | Eb | GBEb | | |

Table 8. Level one in the Introduction of "Kung Hindi Man"

| | Antecedent | Consequent |
|---------------------|----------------|------------|
| | Intro | |
| Chord | Gm | Cm |
| Notes (first voice) | DG,DGA,DGBb | {EbGD, C} |
| Rank | {51, 512, 513} | {352, 1} |
| Direction | {0, +, +} | {0, -} |
| Standing Shadow | {Bb, A, G} | {C} |
| Rank | {3, 2, 1} | {1} |
| Direction | {0, -, -} | |

Table 8.1. Level two in the Introduction of "Kung Hindi Man"

| | Antecedent | Consequent |
|---------------------|---------------------|------------|
| | Intro | |
| Chord | Cm/A | Gm/D |
| Notes (first voice) | {EbGC, EbGBb, EbGA} | {DGC, Bb} |
| Rank | {351, 357, 356} | {514, 3} |
| Direction | {0, -, -} | {0, -} |
| Standing Shadow | {A, Bb, C} | {D} |
| Rank | {6, 7, 1} | {1} |
| Direction | {0, +, +} | |

Table 8.2. Level three in the Introduction of "Kung Hindi Man"

| | Antecedent | Consequent |
|---------------------|--------------|-------------------------------|
| | Intro | |
| Chord | Gm | Cm/Eb, Daug |
| Notes (first voice) | DBb, DA, DG | {DbA, Ab, A, CF*Bb} |
| Rank | {53, 52, 51} | {36, 6, 6, 735 ⁺ } |
| Direction | {0, -, -} | {0, -, +, +} |
| Standing Shadow | G, A, Bb | {Eb, 0, 0, D} |

| | Antecedent | Consequent |
|-----------|------------|--------------|
| Rank | {1, 2, 3} | {3, 0, 0, 1} |
| Direction | {0, +, +} | {0, 0, 0, -} |

The "bending" sound appears at the consequent. There is a shift from a sixth of Cm to its flat, then back to the sixth. It is used to prepare for the last part of the introduction. Another is a bizarre sound produced by the sharp fifth of D, making it an augmented D. This is the chord leading to the last part of the introduction.

Table 8.3. Level four in the Introduction of "Kung Hindi Man"

| | Antecedent | Consequent |
|---------------------|--------------------------|------------|
| | Intro | |
| Chord | Gm | Gm |
| Notes (first voice) | {BbG, D, DBb, G, GD, Bb} | {GBbDG} |
| Rank | {31, 5, 53, 1, 15, 3} | {1351} |
| Direction | {0, -, +, -, +, -} | |
| Standing Shadow | {GG, DD, BbBb} | {GG} |
| Rank | {11, 55, 33} | {11} |
| Direction | {0, -, -} | |

Table 9. The sequence in the first line of the verse of "Kung Hindi Man."

| | Antecedent | Consequent |
|---------------------|--|---|
| | Irog sandaling dinggin | ang aking pagtangis |
| Chord | D, Gm Gm/D | Gm/Bb, Gm/D, Gm, D |
| Notes (first voice) | {D, D*, D, C*; D, G; DBb} | {DG, 0, F*A, GBb, AC, GBb, F*A} |
| Rank | {1, 1 ⁺ , 1, 1 ⁻ ; 5, 1, 53} | {51, 0, 7 ⁺ 2, 13, 24; 45 ⁺ , 35} |
| Direction | {0, +, -, -, +, +, +} | {0, 0, +, +, +, -, -} |
| Standing Shadow | {0, 0, 0, 0; G, 0; DG} | {BbG, DBb, 0, GD; D, DD} |
| Rank | {0, 0, 0, 0; 1, 0; 51} | {35, 53, 0, 15; 1, 11} |
| Direction | {0, +} | {0, +, 0, +, -, +} |
| Running Shadow | {D, C, Bb} | {D*, D, C*, C} |
| Rank | {5, 4, 3} | {1 ⁺ , 1, 7 ⁺ , 7} |
| Direction | {0, -, -} | {0, -, -, -} |

The unusual note hits the syllable "ling" of the phrase "Irog sanding digging", as shown by 5⁻. It indicates the 5th flat. The music emphasised the emotion best expressed in this portion by hitting the flat of the fifth. Another unusual note strikes at 7⁺ and 5⁺, which sounds the emotion at "a" and "ta" of the phrase "...ang aking pagtangis". The plus sign written with 7 and 5 indicates sharp.

Table 9.1. The sequence in the second line of the verse of "Kung Hindi Man."

| | Antecedent | Consequent |
|---------------------|---|---|
| | Irog sandaling tunghan | ang humihibik |
| Chord | D, D7 | G*dim, D, Adim/G, Gm |
| Notes (first voice) | {D, D*, D, C*, D, F*, A} | { FG*, DF*A, DF*AD, 0, A , EbF*C, DGBb} |
| Rank | {1, 1 ⁺ , 1, 1 ⁻ , 1, 3, 5} | {71, 542, 1351, 0, 5, 1 ⁺ 37, 513} |
| Direction | {0, +, -, -, +, +, +} | {0, +, +, -, +, -} |
| Standing Shadow | {D, 0, DC} | {B; C, D, D, 0; G, C*, D} |
| Rank | {1, 17} | {1; 7, 1, 1, 0; 1, 4 ⁺ , 5} |
| Direction | {0, +} | {0, +, +, -, +, +, +} |
| Running Shadow | {Eb, D, C} | {F*, A, G, Bb} |
| Rank | {1 ⁺ , 1, 7} | {0, +, -, +} |
| Direction | {0, -, -} | {0, +, -, +} |

The bending sound appears in the lyric "back" as the rank 1⁺37 of Adim/G leads to 513 of Gm. It appears that Adim/G leads to Gm.

Table 9.2. The sequence in the third line of the verse of "Kung Hindi Man."

| | Antecedent | Consequent |
|---------------------|--|---|
| | Kung 'di man nararapat | sa iyong dikit |
| Chord | G, Bdim, G, Bdim, G | G, Ab, G, Cm |
| Notes (first voice) | { DFG, DFAb, DFG, CDF*, BDG, B, FGD } | { DB, G; GbC; FD, GEb; FGD, 0, EbGC} |
| Rank | {571; 357; 571; 236; 351, 3, 715} | {53, 5; 73; 75, 15 ⁺ , 452, 0, 351} |
| Direction | {0, +, -, -, +, +, +} | {0, -, +, +, +, -, 0, -} |
| Standing Shadow | {B; C; B; Ab, GG, 0, GG} | {G, B, Ab, GG, G, C, G, Ab} |
| Rank | {3; 2; 3; 3; 11, 0, 11} | {1, 3; 1; 11, 1; 1, 5, 5 ⁺ } |
| Direction | {0, +, -, -, -, 0, 0} | {0, -, -, -, -, +, +, +} |
| Running Shadow | {A, B, C} | {G, F*, G, C} |
| Rank | {2, 3, 4} | {4, 4 ⁺ , 4, 1} |
| Direction | {0, +, +} | {0, +, -, +} |

Table 9.3. The sequence in the fourth line of the verse of "Kung Hindi Man."

| | Antecedent | Consequent |
|---------------------|---------------------------|----------------------------|
| | Isang sulyap mo lamang | Aliw na ng dibdib |
| Chord | Cm, Gm/D | {D/Eb, D7, Gm} |
| Notes (first voice) | {EbGC, EbGD, EbGC, EbGBb, | { DG, A, Db, G*; CF*A, Bb, |

| | | |
|------------------|--|---|
| | EbGA; DGBb, AC, BbD} | BbG} |
| Rank | {351, 352, 351, 357, 356; 513, 24, 35} | {14, 5, 7, 5 ⁻ ; 735, 5 ⁺ , 31} |
| Direction | {0, +, -, -, -, +, +, +} | {0, +, -, +, +, +, -} |
| Standing Shadow | {0, 0, A, Bb, C; DD, 0, DG} | {0, Eb; 0, 0, DD; 0, GG} |
| Rank | {0, 0, 6, 7, 1; 55, 0, 51} | {0, 1 ⁺ ; 0, 0, 11; 0, 11} |
| Direction | {0, +, +, +, +, +} | {0, -, +} |
| Augmented Shadow | {F, Eb} | {D, DBb, G, GD, Bb, GBbDG} |
| Rank | {7, 5 ⁺ } | {5, 53, 1, 15, 3, 1351} |
| Running shadow | {0, Bb} | {0, DD, 0, BbBb, 0, GG} |
| Rank | {0, 3} | {0, 55, 0, 33, 0, 11} |
| Direction | {0, -} | {0, -, -, -} |

Table 10. The sequence in the first line of the refrain of "Kung Hindi Man."

| | Antecedent | Consequent |
|---------------------|------------------------------|-------------------------------------|
| | Kung saki'y wala nang | inilaang paglingap |
| Chord | G, Gm, G | G, D7, D |
| Notes (first voice) | {BD, BD; A*D, E; BE, D, DGB} | {GB, 0, 0, BD; AC, GB, AC, GB, F*A} |
| Rank | {35, 35; 35, 6; 36, 5, 513} | {13, 0, 0, 35; 57, 46, 57, 46, 35} |
| Direction | {0, 0, 0, +, 0, -, +} | {0, +, -, -, +, -, -} |
| Standing Shadow | {0, 0, 0, 0, G, DB, D} | {G, DB, GD, 0, DD, 0, DD, 0, DD} |
| Rank | {0, 0, 0, 0, 1, 53, 5} | {1, 53, 15, 0, 11, 0, 11, 0, 11} |
| Direction | {0, +, -} | {0, +, +, -, -, +} |
| Running Shadow | | {E, F*, A, D} |
| Rank | | {2, 3, 5, 1} |
| Direction | | {0, +, +, +} |

Table 10.1 Sequence in the second line of the refrain of "Kung Hindi Man"

| | Antecedent | Consequent |
|---------------------|------------------------------------|---------------------------------|
| | At ang pagdurusa ko | ang siya mong pangarap |
| Chord | D, D7 | Am, D, Gdim, G |
| Notes (first voice) | { AC, GB, F*A, EG, DF*, A, G, F* } | { EC, 0, CE, EG, DF*, C*E, BD } |

| | | |
|-----------------|-------------------------------|---------------------------------|
| Rank | {57, 46, 35, 24, 13, 5, 4, 3} | {53, 0, 35; 24, 13; 57; 35} |
| Direction | {0, -, -, -, -, +, -, -} | {0, -, +, -, -, -} |
| Standing Shadow | {0, 0, 0, 0, D, 0, 0, DC} | {A, EAC, 0; DD, 0; G, C*; D} |
| Rank | {0, 0, 0, 0, 1, 0, 0, 17} | {1, 513, 0; 11, 0; 1, 5; 5} |
| Direction | {0, +, +} | {0, +, -, +} |
| Running Shadow | {G*, B, A} | {F*, E, Eb, D} |
| Rank | {4 ⁺ , 6, 5} | {7, 6, 5 ⁺ , 5} |
| Direction | {0, +, -} | {0, -, -, -} |

There is a bending sound in the running shadow as the note 4⁺ strays to 5 before it lands in 6.

Table 10.2 Sequence in the third line of the refrain of "Kung Hindi Man"

| | Antecedent | Consequent |
|---------------------|---|--|
| | Sa isang ngiti mong | sa aki'y igawad |
| Chord | G, E | E7, Am |
| Notes (first voice) | { BD, BD, BD, F, G*DF, E, DEB} | {FG*D, 0, FG*D, EG*C, EG*B, FG*D, 0, EAC} |
| Rank | { 35, 35, 35, 7; 371 ⁺ , 1, 715} | {1 ⁺ 37, 0, 1 ⁺ 37, 135 ⁺ , 135, 1 ⁺ 37, 0; 513} |
| Direction | {0, 0, 0, +, 0, -, +} | {0, 0, -, -, +, -} |
| Standing Shadow | { G, G, F, B, EB, 0, D*} | {E, EG*D, 0, E, 0, A, D*, E} |
| Rank | { 1, 1, 7, 3, 15, 0, 1 ⁻ } | {1, 137, 0, 1, 0, 4, 1 ⁺ ; 5} |
| Direction | {0, 0, -, -, -, +} | {0, +, -, +, +} |
| Running Shadow | {E, F, E} | {A, C} |
| Rank | {1, 1 ⁺ , 1} | {1, 3} |
| Direction | {0, +, -} | {0, +} |

A bending sound is produced by the word or lyric "ngiti" as 371⁺ shifts to 1. This sound shifts from F to E, augmenting the root of the chord E. It prepares for the lyric "mong."

Table 10.3 Sequence in the fourth line of the refrain of "Kung Hindi Man"

| | Antecedent | | Consequent |
|---------------------|-----------------|--------------------|-------------------------------|
| | Libo mang | kamatayan | aking tinatangap. |
| Chord | Cm | G/D | G, Am, D, G |
| Notes (first voice) | { EbA, B, EbGC} | { EbA, DG, A, DGB} | { DB, CEA, C, ACE, CDF*, BDG} |

| | | | |
|------------------|----------------------------|------------------|--|
| Rank | {35, 7 ⁺ , 351} | {35; 51, 2, 513} | {35; 351, 3, 135, 713; 351} |
| Direction | {0, +, +} | 0, -, +, +} | {0, -, +, -, +, +} |
| Standing Shadow | {CC, 0, CGA} | {DD, 0, DGB} | {AEG, 0, DG, DA, GD} |
| Rank | {11, 0, 156} | {55, 0, 513} | {157, 0, 47; 15; 15} |
| Direction | {0, 0, +} | {0, 0, +} | |
| Augmented Shadow | {EbGACEb} | {DGBD} | {GBbC*, GBD, GBF*, GBE, GBEB, F*CD} |
| Rank | {35613} | {5135} | {13 ⁵⁻ , 135, 131 ⁻ , 136, 135 ⁺ , 371} |
| Running Shadow | | | {C*, D, F*, E, Eb, F*CD} |
| Rank | | | {5 ⁻ , 5, 7, 6, 5 ⁺ ; 1} |

There is a bending sound in the lyric "limbo" produced by 7⁺(B). Augmenting 7 prepares them for the bang of the chord EbGACEb

Table 10.4 Sequence leading to repeat the refrain of "Kung Hindi Man"

| | Antecedent |
|---------------------|----------------------|
| | Kung sa ki'y wa. |
| Chord | D7, G |
| Notes (first voice) | { F*CD, CD, D, D, E} |
| Rank | {371, 51, 1, 1, 6} |
| Direction | {0, 0, 0, 0, +} |
| Standing Shadow | {D, D, 0, 0, 0} |
| Rank | {1, 1, 0, 0, 0} |
| Direction | {0, 0, 0, 0, +} |
| Proceed to refrain | |

Table 10.5 Sequence in the last part of "Kung Hindi Man"

| | Consequent |
|---------------------|----------------------------|
| | King tinatanggap |
| Chord | Bdim/A, Am, D, G |
| Notes (first voice) | BDFG*, A, GAE, F*ACD, GBDG |
| Rank | {1357, 1, 715, 3571, 1356} |
| Direction | {0, +, -, +, +} |

| | |
|------------------|---|
| Standing Shadow | {A, A, AEG, DA, GG} |
| Rank | {1,1,157;15, 11} |
| Direction | {0, +, +, +, -} |
| Augmented Shadow | C*, D, G, B; F*, G, B, D; A*, B, D, GADG |
| Rank | 5̄, 5, 1, 3; 7, 1, 3, 5; 3̄, 3, 5, 1251 |
| Direction | {0, -, +, +, +, -, +, +, +, -, +, +, +} |
| Running Shadow | {0, 0, 0, DD, 0, 0, 0, BbBb, 0, 0, 0, GG} |
| Rank | {0, 0, 0, 55, 0, 0, 0, 3̄3̄, 0, 0, 0, 11} |
| Direction | {{0, 0, 0, -, 0, 0, 0, -, 0, 0, 0, -}} |

Bdim served as a leading chord to Am. The bending sound is produced as the chord 3̄3̄ (BbBb) combines with the chord G. There is a stress effect when D is substituted for G.

7. Summary of Findings

The following are the inharmonic chords and notes in the song. These are expressed in ranks. When expressed in the form of ranks, it manifests how it works in the song, how they can be applied to other songs, and most importantly, it gives us an idea of why they sound amazing and touches our emotion despite their inharmonic.

Table 11. The inharmonic chord in the song

| SOUND | LOCATION | INHARMONIC CHORD | RANK |
|----------------|-------------------------------------|------------------------|-----------------|
| BENDING SOUND | Preparation for the last intro part | Cm6/Eb-Cmaug/Eb-Cm6/Eb | 4m/3-4maug-4m/3 |
| | <u>Kung sa aki'y wala na</u> | G-Gm-G | 1-1m-1 |
| | Kung di man | G-Bdim-G | 1-3dim-1 |
| SHIFTING SOUND | Preparation for the last intro part | Daug-Gm | 5aug-1m |
| | <u>ang humihibik</u> | Bdim-D | 3dim-5 |
| | <u>ang humihibik</u> | Adim/G-Gm | 2dim-1m |
| | pangarap | Gm-G | 1m-1 |
| | ngiti mong | Bdim-E | 3dim-6 |
| POSTURE SOUND | pagtangis | D | 5 for 1 |
| | ngiti <u>mong</u> | E | 6 for 6m |
| | Libo | Cm | 4m for 4 |

Table 11.1. The inharmonic notes in the song

| SOUND | LOCATION | CHORD | INHARMONIC NOTES | RANK |
|---------------|-----------------|-------|------------------|--|
| BENDING SOUND | Irog sandaling | D | D, D*, D, D* | 5, 5 ⁺ , 5, 5 ⁺ |
| | after pagtangis | D | D*, D, C*, C | 1 ⁺ , 1, 1 ⁻ , 7 |
| | after pagtangis | D | D*, D, C*, C | 1 ⁺ , 1, 1 ⁻ , 7 |

| | | | |
|-----------------------|----|-------------------|--|
| after humihibik | Gm | F*, A, G, Bb | 1 ⁻ , 2, 1, 3 |
| after dikit | Cm | G, F*, G, C | 5, 5 ⁻ , 5, 1 |
| after paglingap | D | E, F*, A, D | 2, 3, 5, 1 |
| after pagdurusa ko | D | G*, B, A | 4 ⁺ , 6, 5 |
| after pangarap | G | F*, E, Eb, D | 7, 6, 5 ⁺ , 5 |
| after mong | E | E, F, E | 1, 1 ⁺ , 1 |
| | | C*, D, F*, E, Eb, | 5 ⁻ , 5, 7, 6, 5 ⁺ ; |
| after tinatanggap | G | F*CD | 1 |

8. Conclusions

The method used in this study, which uses ranks through sequence, has excellent benefits since playing the piano and other instruments are based on pattern theories. When the notes are expressed in a group of numbers (ranks), they immediately suggest application to all other keys and chords. The mind thinks fast when musicians see it in ranks. As found in this study, the inharmonic notes and chords are easily identified because they were expressed in numbers. When the musician sees the piece in terms of ranks, they immediately find connections between the chords present.

Based on the findings, there are different areas where the unique sound of "Kung Hindi Man" are recognised. Their rank can generalise them:

1. Inharmonic chord.
 - a. Shifting from the fourth minor to minor augmented and back to the minor chord
 - b. Shifting from the first major to minor, then back to a major chord
 - c. Leading of fifth augmented to a first minor chord
 - d. Leading of the third diminished to a fifth major chord
 - e. Leading from the second diminished to a first minor chord
 - f. Leading from the first minor to the first major chord
 - g. Leading from sixth diminished to a third minor chord
2. Inharmonic notes
 - a. The bending notes are found chiefly in the augmented shadow
 - b. It is also observed that the bending is produced mainly by taking the flat and sharp first note of the chords
 - c. It is also observed that the bending is mainly produced by taking the flat and sharp fifth note of the chords
 - d. It is also observed that the sixth and seventh notes of the chord are used whenever the sequence is descending or alternate direction
3. Substitute chords
 - a. Substitute chords produce a unique and compelling sound to represent the posture of the song's message. Substitute chords are based on the intention of the composer. When the message is supposed to be upright, they use major chords; if it is emotional, they use minor chords.
 - b. There are several substitute chords found. The fifth chord is for the first, the 6th major for the 6th minor and 4th minor for the fourth major chords.

The disadvantage of this method is that the particular note may need to find its proper position on the piano immediately. This position is because the notes are repeatedly represented as 1-7. There are times when the note is played in a different octave. The advantage of the score sheet is that the notes are written in the five lines of the G and Bass clef, which specify the exact location. The process also takes time since there is a need to express the notes in letters first and then in ranks to manifest the pattern and regularity of notes.

9. Recommendations

With the benefits of this method, a program should be designed to express the piece in numerical form automatically. With its establishing connections between chords, it is recommended that other kundiman songs be studied using this method. The study includes only the first voice, standing shadow, augmented shadow and running shadow. We can extend the analysis to include four more sequences which will compose of the intro voice and the terminal voice with their standing shadows.

10. Acknowledgement

I want to thank the library of UP Diliman for generously sending the piece "Kung Hindi Man", which is very difficult to obtain today. I would like to recognise the support of my sister Ma. Christine Muyco Levi in refining my paper and sharing her expert knowledge in music.

References

- [1] Bagaria, J. (2023). "Set Theory". *Stanford Encyclopedia of Philosophy*. First published in 2014. <https://plato.stanford.edu/entries/set-theory/>
- [2] Chord progression influences emotion (2023). Youtube. Retrieved. From <https://www.youtube.com/watch?v=40PGXoUvaKA> last June 20, 2023
- [3] Diminished chords are just dominant chords in disguise (2023). Music Theory for Guitar. Retrieved from https://www.youtube.com/watch?v=YL_ZYBW0uz0 last June 15, 2023
- [4] Feld, S. (2012). "Sound and Sentiment: Birds, Weeping, Poetics, and Song in Kaluli Expression", 3rd ed. Duke University Press.
- [5] Martin, L. (2023). Basic Music Theory for Adult Beginner Level Piano Players with emphasis on half steps and whole steps. Retrieved from http://www.lakesidepress.com/Piano_Syllabus.pdf
- [6] Merriam- Webster. (n.d.). Braggadocio In Merriam-Webster.com Dictionary Retrieved July 6, 2023 <https://www.merriam-webster.com/dictionary/shadow>.
- [7] Tagalog Lang. (2002). Learn Tagalog online. <https://www.tagaloglang.com/kundiman/>
- [8] Werner Blum and Mogens Niss. (1991). "Applied Mathematical Problem Solving, Modelling, Applications, and Links to Other Subjects: State, Trends and Issues in Mathematics Instruction". *Educational Studies in Mathematics*, Feb. 1991, Vol. 22, No. 1 (Feb. 1991), pp. 37-68. Springer Publications.