UNIVERSITI TEKNOLOGI MARA

ANALYSIS OF ROOM MODES AND SOUND PRESSURE LEVEL (SPL) IN UiTM

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ABSTRACT

The acoustic quality in certain room depends on its dimension and will response to the room modes for example the axial, tangential and oblique mode of the room. Sound of pressure level (SPL) is a parameter that can be affected by room modes and it is important to design a room or multipurpose hall. This project is focused in FKE's meeting room (7.22) and in a class room (3.57). These two rooms were chosen to compare the room modes and SPL by using the MATLAB 7.0 simulation. The dimension of the room should not have same width, length or height to avoid the same eigentone frequencies exists. The best rooms sounding are designed to have many eigentone frequencies that are evenly distributed, rather than just groups of eigentones that clustered together. The room should not be too small or too large for a good distribution of eigentones through out the room. The worst condition of room dimension is a perfect cube for example 3.5x3.5x3.5 meters because the equally dimensions can caused the same eigentone frequencies exist. The small room produces higher eigentone frequencies while a larger room produces lower eigentone frequencies. Each eigentone frequency has its own SPL whereby SPL in decibel (dB) will diminish with increasing the distance from a source.

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CHAPTER 1

INTRODUCTION

1.0 CHAPTER OVERVIEW

This chapter will give a brief introduction about history and the enclosure of the acoustic. The objectives and scopes of this project will also be presented in this chapter. Besides, the background study of this project will also be briefly explained. The last part of this chapter briefly introduces the structure of this thesis.

1.1 INTRODUCTION

Acoustics is a branch of physics that studies sound, namely mechanical waves in gases, liquids, and solids. Acoustics is the scientific studies about the sound wave propagation where the wave, absorb and reflect depending on what medium it reach. In other word, acoustic is science of sound both physical and psychophysical [1].

The studies begin by describing on sound field that occur indoors, the properties finishes in the room and room's dimension. This is due to the irregular distribution of eigentones at low audio frequencies [1].

Small rooms with the volume less than $1000m^3$ normally have an irregular's sound response at low frequencies. This is due to the irregular distribution of eigentones at low audio frequencies [2].

Modes in small rooms may lead to uneven frequency response and extended sound decays at low frequencies. In critical listening environments this often causes unwanted