ABSTRACT

AN ACOUSTIC STUDY OF THE STEELPAN

Fasil Muddeen

This thesis presents the results obtained from the application of Nearfield Acoustical Holography (NAH) to the soundfield of a selection of Caribbean steelpans. The NAH technique uses a single planar measurement of the soundfield of a source to construct its three-dimensional behaviour. Specifically, NAH is used to generate the sound pressure levels (SPL), active intensities (AI) and reactive intensities (RI) in a three-dimensional space around the instruments under test. Also generated as a result of the study was a set of Audio/Video Interleaved (AVI) files depicting the behaviour of the acoustic parameters named above, with time.

The thesis describes the development of the NAH algorithms used as well as the derivation of a set of equations used to describe the ray paths followed by the sound emitted from the note being played. The ray tracing method is applied to the results to validate and explain them.

The principal subject of the study was a tenor steelpan manufactured by Bertrand Kelman. Other steelpans studied were a bass steelpan also manufactured by Bertrand Kelman and a tenor steel pan manufactured by Felix Rohner.

Keywords: Fasil Muddeen, Nearfield Acoustical Holography, Acoustics, Steelpan.