

TIME-DOMAIN SIMULATIONS OF A TEN-STRING BRAZILIAN GUITAR

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ABSTRACT

The Brazilian guitars are originally countryside traditional instruments played in different regions of Brazil where several variations of body shapes, types of wood, numbers of strings and tunings are normally found. The present work is focused on the viola capira (portuguese for countryside guitar), which is the most common type and plays a substantial role in traditional and recent Brazilian music. In general, it has ten steel strings arranged in five pairs which are coupled to the soundboard through the bridge in the same way of classical guitars. In order to analyse the interaction between the body and the strings of the instrument, a physical modelling based on an hybrid approach is developed; body modes are identified using experimental modal analysis and are coupled to the modes of an array of strings. A set of time-domain simulations is performed in order to reveal some specificities of the string-body coupling on the Brazilian guitars in terms of sympathetic resonances and beating phenomena.