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| **Thesis Title** | An implement 2 ways perfect linear phase crossover designs using digital IIR filters base on FPGAs |
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## ABSTRACT

This thesis presents an implementation of two-ways digital crossover network for audio frequencies band on FPGAs using perfect linear phase IIR filters structure base on two-pass filtering of the real-time noncausal and causal IIR subfilters. This structure has a new characteristics such as linear phase, flat group delay, high transition band and flat magnitude response over audio frequencies, these are require and the important properties in designing a novel crossover network. In order to design and implemented the circuits on FPGAs, this thesis proposes the method of designing Last In First Out (LIFO) part and Delay part by using memory instead of a shift register which the designing area is minimize. For the filter circuits, the Distributed Arithmetic (DA) structure is used for signal processing. The structure use look-up table (LUT) instead of multiplication which can reduce the processing time of the system.