

ANALYZING AND SYNTHESIZING FIRST ORDER AND SECOND ORDER UNDERDAMPED SYSTEMS

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ABSTRACT

The following report details the development and implementation of hardware and a software application required to acquire and analyze transient response produced by a system for a step input.

The scope of project is limited to analyze the transient response of first-order systems and second-order underdamped systems. The transient response of 2 types of system to be studied will be sampled using a PIC microcontroller and transfer the data to the PC via serial port. A Microsoft Windows based software application developed MATLAB will then analyze the data to decide the order of the system and display the waveform. This software application will also calculate the component value (resistance, capacitance and inductance) requires synthesizing a system which will produce the same response as the original system.

The input bandwidth of the hardware used will be limited to 10 kHz for design simplicity and to reduce the programming overhead, data will be initially logged to file.