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Analysis of Electric Circuits using MATLAB and Simulink

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Circuit networks are pathways created for electrons to flow, they become convoluted or difficult as some students say, when they are connected to various electrical components; such as resistors, capacitors and inductors. Electric circuit analysis becomes a necessary course for the students of Physics, Computer Electronics and Electrical Engineering. The dropout rate is higher in these courses because students lose interest in just solving problems and analyzing them using textbook examples and simulation software packages. The pre-designed software packages are not helpful in understanding the calculation and analysis of electrical circuit components. This paper discusses the analysis of electric circuit with MATLAB and Simulink Package. Electrical circuit analysis activity demands an interdisciplinary approach which promotes collaborative project-based learning (PBL). During contact sessions in an undergraduate class, the students were given the task to solve problems in an electric circuit. However, the students had difficulty in having a 'sail through' understanding, until MATLAB was incorporated. It was observed that with implementing the problems in MATLAB the students were gaining a better understanding of electric circuit analysis problems and their interest level also increased - which resulted in better retention in the course. The name MATLAB stands for MATrix LABoratory. MATLAB was written originally to provide easy access to matrix software developed by the LINPACK (linear system package) and EISPACK (Eigen system package) projects. MATLAB is computational in nature and provides a conceptual approach for designing and solving problems in electrical circuits. MATLAB has embedded software called SIMULINK which provides an essential way to model, simulate and analyze electrical systems which are characterized by some inputs and outputs. This paper discusses most importantly the various examples carried out using MATLAB in testing the basic electrical circuits for the exploration of basic DC/AC circuit computations. Students' experience improved using MATLAB package and the awareness of usage was invoked.

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