



TOPICS IN ELECTRICAL ENGINEERING

About Topics in Electrical Engineering

Topics in Electrical Engineering

These documents carry out common design calculations from several different branches of electrical engineering. These applications use Mathcad's complex arithmetic, matrix operators, equation solving power, and plotting capabilities to provide a reference source of Mathcad methods and formulas. This collection includes the following applications:

- electromagnetics, including transmission lines/Smith charts
- circuit and feedback analysis
- signal processing techniques
- filter and transfer functions

These applications have been developed as general-purpose tools that illustrate a variety of useful Mathcad techniques. The documents implement standard algorithms that are effective for a broad range of problems. All of these documents are designed as guidelines, and you are encouraged to modify variables and units to suit your application. Reference works on each topic are listed in the section, should you require more information regarding the physical principles or mathematical techniques used to solve these problems.

There are usually several possible ways of implementing a given method in Mathcad. Because these engineering applications are designed with clarity and flexibility in mind, they will not always provide the fastest possible Mathcad solution for every problem. However, you can use the techniques illustrated in these documents to build streamlined solutions tailored to a particular problem type, and as examples of how to construct mathematical models in Mathcad for various types of electrical engineering problems.

The Layout

Each document has the following sections:

Title Page- Introduces the application and contains a brief summary of how to use the model.

Background- Briefly describes the mathematics or physics used in the application.

Mathcad Implementation- Presents the equations of the model with descriptive text. Describes or plots the results of the application.

Hints - Suggests and documents how to adapt the presented techniques to solve related problems, or expand upon the given example. This section may also contain examples of special cases for topic at hand, or discuss related problems of interest.

A few of the applications did not lend themselves to this exact format. In these cases the application is presented in as similar a style as possible.

In each application you will see definitions you can modify, parameters you may want to change, and usually a plot showing the results of the calculation. By changing definitions and parameters in these applications, you can adapt them to suit your physical constraints and solve your own engineering problems.

Notes on Copying

To copy material from the documents in this collection, just drag your mouse across the regions until you see a dotted line surrounding the material you want. When you release your mouse, you will see the selected regions highlighted in light blue. Then, use copy & paste to copy the regions into another Mathcad document. Alternatively, once you have the desired regions selected/highlighted in light blue, you may drag those regions into your working document.

To copy the entire file to your working document, **Select All** using <Ctrl><a> then **Copy** <Ctrl><c> and **Paste** <Ctrl><v>.

Notes on Units

By default, Mathcad uses units from the SI unit system (International System of Units). Mathcad offers several choices of unit systems: SI, CGS, U.S. Results will be displayed in the unit system chosen by the author. If you change unit systems, *results* will be changed to the new system, but any units in the problem (input variables) will remain as the author entered them.