

## **Spreadsheets for Designing Inductors and Transformers for Use in Power Electronic Converters**

Two Excel files (spreadsheets) are contained in this folder. The Inductor Design file automates the design of ferrite-core-based inductors used in power electronic converter circuits. The Transformer Design file does the same for transformers. The design inputs, obtained from the converter-based electrical specifications for the magnetic component, are entered into the input section of the spreadsheet by means of so-called slide bars located there. The output section of the spreadsheet displays the detailed parameters (conductor area, number of turns, core size, etc.) found by the spreadsheet which are needed for fabricating the required inductor or transformer. Both the input section and output sections of the spreadsheet are on the worksheet entitled INOUT . The other worksheets in the file each contain the detailed data for a specific core geometry.

Both files contain detailed information on nearly all of the commonly used core geometries and sizes and ferrite materials used for inductors and transformers. The output section lists the suggested parameters for the desired component for each core geometry in the database capable of satisfying the input requirements. The parameters are calculated using the design algorithms detailed in the second edition of the textbook: Power Electronics: Converters, Applications, and Design by Mohan, Undeland, and Robbins, published by John Wiley and Sons. The basis of the algorithm is the limiting of the temperature of the component to a maximum specified value. The Power Point file, Magnetic Design Methods provides further details about the spreadsheets.

If the spreadsheets cannot find a core size in a specific core geometry that will permit the construction of the needed inductor or transformer, the entry #N/A will be displayed in most of the cells of the output row for that core geometry. In some cases one or more cells in a specific output row may contain negative numbers or the entry, #NUM! . These latter entries indicate problems in the numerical evaluation of the formulas in these specific cells and should be ignored. The airgap length cell in the Inductor Design spreadsheet is the most likely cell to have numerical problems. The rest of the entries in the row are still reliable.

The files are designed to execute on any version of Microsoft Excel beginning with Excel 5.0 on either Windows-based computers or Macintosh computers. The only problems found to date have been with the slide bars on the input section of the spreadsheet. On older versions of Excel on Macintosh computers, the coarse entry slide bars do not function. However the fine control via the up/down arrows on the slide bar do function.