



# **Antenna Analysis and Design Using FEKO Electromagnetic Simulation Software (ACES Series on Computational Electromagnetics and Engineering)**

*Atef Z. Elsherbeni, Payam Nayeri, C. J. Reddy*

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The objective of this book is to introduce students and interested researchers to antenna design and analysis using the popular commercial electromagnetic software FEKO. This book is primarily intended for students working in the field of antenna analysis and design; however the wealth of hands-on design examples presented in this book along with simulation details also makes it a valuable reference for practicing engineers. The requirement for the readers of this book is to be familiar with the basics of antenna theory; however electrical engineering students taking an introductory course in antenna engineering can also benefit from this book as a supplementary text.

The key strengths of this book are as follows

- \* First, the basics of antenna simulation will be presented in a detailed, understandable, and easy-to-follow procedure through study of the simplest types of radiators, i.e. dipole and loop antennas, in chapters 2 and 3. This will build the fundamental knowledge a student would need in order to utilize antenna simulation software in general.
- \* Second, comparison between theoretical analysis and full-wave simulation results of FEKO are given for a variety of antenna types, which will aid the readers with a better understanding of the theory, approximations and limitations in the theoretical analysis, and solution accuracy.
- \* Third, and of paramount importance, is the visualization of the antenna current distribution, radiation patterns, and other radiation characteristics that are made available through full-wave simulations using FEKO. A proper analysis of the radiation characteristics through these visualizations serves as a powerful educational tool to fully understand the radiation behavior of antennas.

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FEKO is a comprehensive electromagnetic simulation software tool, based on state of the art computational electromagnetics (CEM) techniques. It enables users to solve a wide range of electromagnetic problems. The multiple solution techniques available within FEKO make it applicable to a wide range of problems for a large array of industries. Typical applications include

- EMC: analysis of diverse EMC problems including shielding effectiveness of an enclosure, cable coupling analysis in complex environments, e.g. wiring in a car, radiation hazard analysis.
- Bio-electromagnetics: analysis of homogeneous or non-homogeneous bodies, SAR extraction.
- RF components: analysis of waveguide structures, e.g. filter, slotted antennas, directional couplers.

[Request PDF on ResearchGate | Antenna Design Using Electromagnetic Simulations](#) | In this chapter, we formulate the antenna design task as a nonlinear minimization problem. We introduce necessary notation, discuss typical objectives and constraints, and give a brief overview of conventional optimization techniques, including gradient-based and... Numerical results are presented on a series of benchmark test functions and on an aerodynamic shape design problem. The results obtained suggest that the proposed optimization framework converges to good designs on a limited computational budget. This is achieved by using CAD FEKO 6.1, electromagnetic simulation software. The model is designed with a resonant frequency of 2.65GHz. [Read more.](#)

Altair provides leading electromagnetic simulation software from static to high frequency applications, including antenna design and placement, EMC and RCS. Our experience with the software is so positive that we added Feko to our company strategic tool list. Julie Huffman. Lockheed Martin Space Systems, USA. Antenna Design and Placement. Feko is widely used in the industry for the analysis and design of antennas for industries such as, radio and TV broadcasting, wireless, cellular and communication systems, remote keyless entry systems, tire pressure monitoring systems, satellite positioning and communications, radars, RFID and many others. @inproceedings{Elsherbeni2014AntennaAA, title={Antenna Analysis and Design Using FEKO Electromagnetic Simulation Software}, author={Atef Z. Elsherbeni and Payam Nayeri and Chinnapu Reddy Jayaprakash Reddy}, year={2014} }. The objective of this book is to introduce students and interested researchers to antenna design and analysis using the popular commercial electromagnetic software FEKO. This book, being tutorial in nature, is primarily intended for students working in the field of antenna analysis and design; however the wealth of hands-on design examples presented in this book along with simulation details, makes it a valuable reference for practicing engineers. The requirement for the readers of this book is CONTINUE READING. View PDF. Antenna, electromagnetics and transmission line simulators are a special breed of software because of the sophisticated 3-dimensional. FEKO is easy to use and it has an integrated GUI from geometry modeling to results visualization, post-processing and report generation. Free student. Simulation Software. EMPro EM simulation software features a modern design, simulation and analysis environment, high capacity simulation technologies and integration with the industry's leading RF and microwave circuit design environment. A design platform for analyzing the 3D EM effects of components such as high-speed and RF IC packages, bondwires, antennas, on-chip and off-chip embedded passives and PCB interconnects. Free trial.