ModePROP

ModePROP is an Eigenmode expansion propagation tool that accounts for both forward and backward propagation and radiation modes. It provides a rigorous steady-state solution to Maxwell’s equations that is based on the highly-stable Modal Transmission Line Theory. A full array of analysis and simulation features make this tool flexible and easy to use.

Benefits
- Rigorous full-vector analysis.
- Solves for both forward and backward traveling modes.
- Fully integrated into the RSoft CAD Environment (page 6).

Applications
ModePROP has applications including, but not limited to:
- Waveguide/fiber-based systems
- Surface-normal grating couplers
- Plasmonic devices
- Sensors
- Filters
- Mode converters
- Photonic bandgap
- Computing coupling efficiency

Featured Application
ModePROP simulation results of a blazed finite surface grating. An incident Gaussian beam is coupled into a waveguide by a surface grating.
Features

- Full-vectorial analysis for both Cartesian and cylindrical (azimuthally symmetric) structures in 2D and 3D.
- Modal Transmission Line (MTL) framework to ensure that the simulation is unconditionally stable.
- Increased performance through multi-threading and GPU acceleration on computers with multiple cores/CPU's and high-end graphics cards.
- Accounts for reflections.
- User-defined initial field.
- Accommodates complex index for lossy materials and high index contrast profiles.
- Robust meshing scheme which conforms to the structure.
- PML boundary conditions.
- Output information includes transmission/reflection of individual modes as well as total values, and the Poynting Vector.
- Sophisticated output options allow user to calculate and display field profiles and other electro-magnetic quantities at any position.
- Automated parametric studies and design optimization using MOST (page 24).

Simulation results that show the field scattered by an air groove.

Simulated field within a surface plasmon based interferometer that is operating out of phase.

SEE PAGE 42 FOR SYSTEM REQUIREMENTS