ModeSYS

ModeSYS supports the design and simulation of multimode fiber optic systems. With a primary focus on data communication applications, ModeSYS allows users to evaluate both temporal and spatial attributes of optical signal propagation. ModeSYS can be used as a standalone tool or combined with OptSim to form a comprehensive single-mode and multimode optical communication system design suite.

Benefits

- Simulates both temporal waveform and spatial modes of multimode systems combining system-level speed with device-level representation accuracy.
- Virtual prototyping of the multimode optical communication system for increased productivity and reduced time to market.
- Fully supports yield analysis through statistical models of multimode fiber defects such as Cambridge 81 and 108 fiber models.
- Interfaces with device-level tools such as BeamPROP to simulate at the system level custom components designed at the device level.

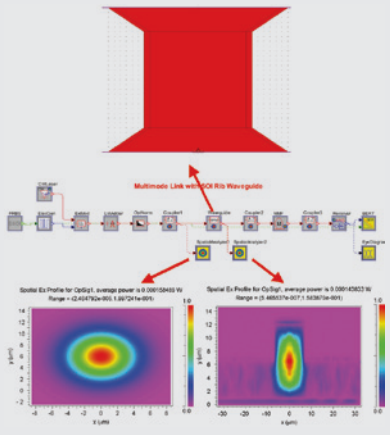
Applications

ModeSYS is ideally suited for computer-aided design of multimode optical communication systems including, but not limited to:

- Gigabit Ethernet, e.g. 1GbE, 10GbE
- 10GBASE- systems, e.g. SX, LX-4 and LRM
- Serial/WDM
- FTTx/PON
- EDC
- Optical Interconnects
- FSO

Featured Application

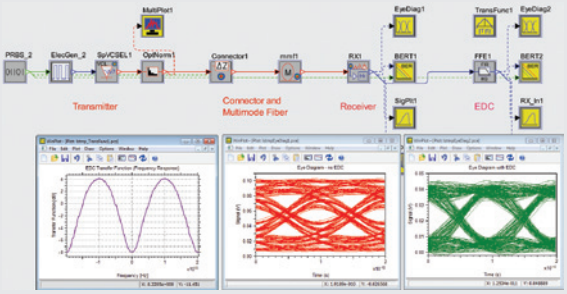
- ModeSYS-BeamPROP co-simulation enables the user to simulate in the context of a ModeSYS multi-mode system simulation a component designed at the device level in BeamPROP.
- BeamPROP uses the Beam Propagation Method (BPM) to simulate custom components such as waveguides, lenses, couplers, gratings, etc.
- The figure depicts a 6-mm long waveguide with an input/output width of 14μm that tapers to 8μm within the 4-mm long central region. The substrate, core (index = 3.5) and layer (index = 1.5) materials have different indexes.



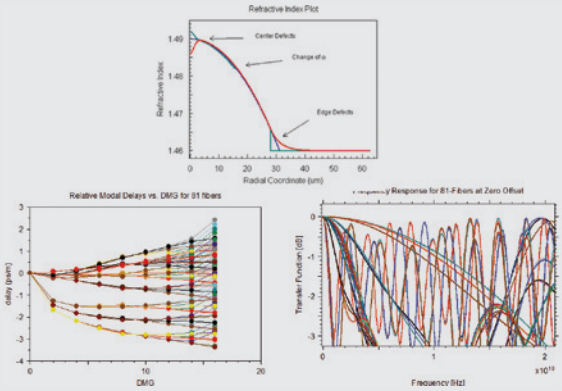
Using BeamPROP's SOI-based rib waveguide design in ModeSYS to analyze its system level performance

Features

- Multimode fiber model includes Helmholtz equation solver supporting arbitrary index profile and index profile perturbations.
- Extensive set of measurement tools enables the user to analyze key characteristics of multimode optical communication systems, such as:
  - Transverse mode profiles
  - Effective modal bandwidth (EMB)
  - Signal over time
  - Differential Mode Delay (DMD)
  - Signal spectra
  - Encircled Flux (EF)
  - Eye diagrams
  - Radial power distributions
  - BER
- Mode-propagation model supports modal dispersion and Differential Mode Attenuation (DMA).
- Comprehensive spatial model using distinct transverse mode profiles supports launch-condition, optical-coupling, and alignment-tolerances analysis.
- Mode coupling effects to model random exchange of powers between modes due to microbends and geometric irregularities in a real fiber.
- Extensive library of predefined manufacturer components makes it easy to model commercially available devices.
- Deterministic and statistical component parameter sweeping.
- Powerful encryption capabilities make protecting your schematics and model parameters easier than ever.
- Application Programming Interface (API) for programming languages such as C/C++ for the development of custom user models.



Modeling of Electronic Dispersion Compensation (EDC) in ModeSYS. ModeSYS and OptSim include FFE- and DFE-based EDC with MMSE-based optimization.



Studying the impact of refractive index profile perturbations using Cambridge-81 and Cambridge-108 models in ModeSYS.

SEE PAGE 42 FOR SYSTEM REQUIREMENTS