Beam Propogation Method Simulator

Informative session

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Overview

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Salient features

The BPM solver calculates spatially varying envelopes (SVEs) of electric field and magnetic flux along the waveguide propagation direction.

Salient features –

- Materials with constant / wavelength dependent real and imaginary permittivity.
- *Scalar* or *vectorial* mode-equation can be selected.
- Bi-directional BPM solver is supported (on experimental basis).
- Stores spatially varying envelopes of electric and magnetic field vectors in hdf file.
- Creates an *xdmf* file for visualization in *paraview*.
- Supports PML BC at the transverse boundaries

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Easy-to-use Config file

```
File: {
  Device = "bpmSiWG_str.cfg";
  Out = "SiWG";
}

Solver: {
  Simulation = "BPM"; // Options: "Bi-BPM", "BPM"
  Equation = "Scalar";
  Polarization = "TM";
  Wavelength = 0.9;
  EffectiveIndex = 3.5;
  DecayConstant = 0.1;
  InterfacesX = [-0.5, 5.0, 10.];
  BidirectionalDecayFactor = 0.1;
  BidirectionalTolerence = 1E-3;
  BidirectionalIterations = 20;
}

Source*left1: {
  Type = "Mode";
  CoordinateXCut = -4.5;
  Intensity = 1000;
}

Boundary*ybdr: {
  Axis = [ "Y", "Z"];
  Model = "CPML";
  PMLLayers = 5.;
  sigmamax = 1.;
}
```

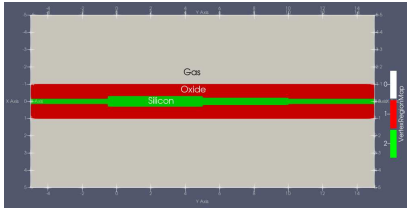


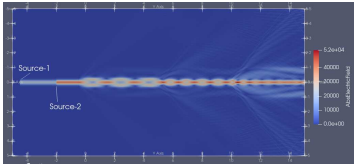
Figure: Structure of the simulated waveguide

- Include a new device structure.
- Define various solver settings, such as-
  - `BPM` or `Bi-BPM-`
  - Polarization (`TM` or `TE`).
  - Locations of discontinuity.
  - `Bi-BPM-`
- Add sources at various locations on the wave-gude.
- Apply specific boundary conditions.

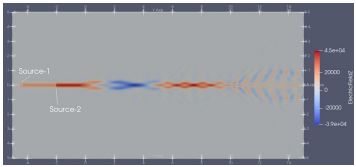
Results Visualization

```
Plot: {
  Quantities = ["AbsElectricField",
                "AbsReverseElectricField",
                "ModeAbsElectricField",
                "MagneticFluxY",
                "ImMagneticFluxY"];
}
```

- `Quantities` to be saved.
- Saves an *xdmf* script for visualization in *paraview*.



(a) Magnitude of electric field envelope



(b) SVE of E_z

Figure: Magnitude of electric field and SVE of E_z.

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Easy-to-install licenses

For ordering a license, along with the name and the organization details, please also provide –

- For the node-locked licenses: Ethernet mac address of the client machine on which the software will run.
  OR
- For the server licenses: Ethernet mac address of the server machine at the client organization.

If you purchased one or more node-locked licenses, you will receive the following license file by secured email.

1. NodeLocked License_<id>_<Info>.lic, where <id> stands for license id and <Info> stands for customer identification in short.

Copy the license file to `/var/local/oesoft/licenses/` on the machine whose mac-address has been provided and change its access rights to `777`.

If you purchased one or more server licenses, you will receive the following license file by secured email.

1. Server License_<id>_<Info>.lic

Copy the license file to `/usr/share/oesoft/licenses/` on the *server machine* whose mac-address has been provided.

The End

Questions? Comments?