An introduction to lightlabsFDS

- The lightlabsFDS mission
- Solver
- Interface
- Hardware
- End it

The lightlabsFDS mission

To enable engineers and scientists to characterize optical structures quickly, simply, and cost-effectively.

Innovate on three fronts to make this a reality:

- Solve for electromagnetic fields in the frequency domain,
- Run simulations from pre-installed scientific software (Matlab),
- Offload computation to centralized custom-tuned hardware.

Solving electromagnetics in the frequency domain

- lightlabsFDS: Frequency-Domain Solver

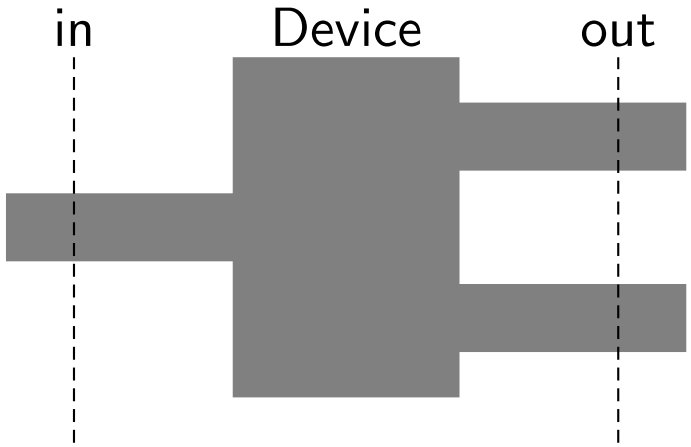
- Solves

$$\nabla \times \mu^{-1} \nabla \times E - \omega^2 \epsilon E = -i\omega J. \tag{1}$$

  - Inputs: frequency (ω), structure (μ, ϵ), and excitation (J).
  - Outputs: electromagnetic fields (E, H, D, B).

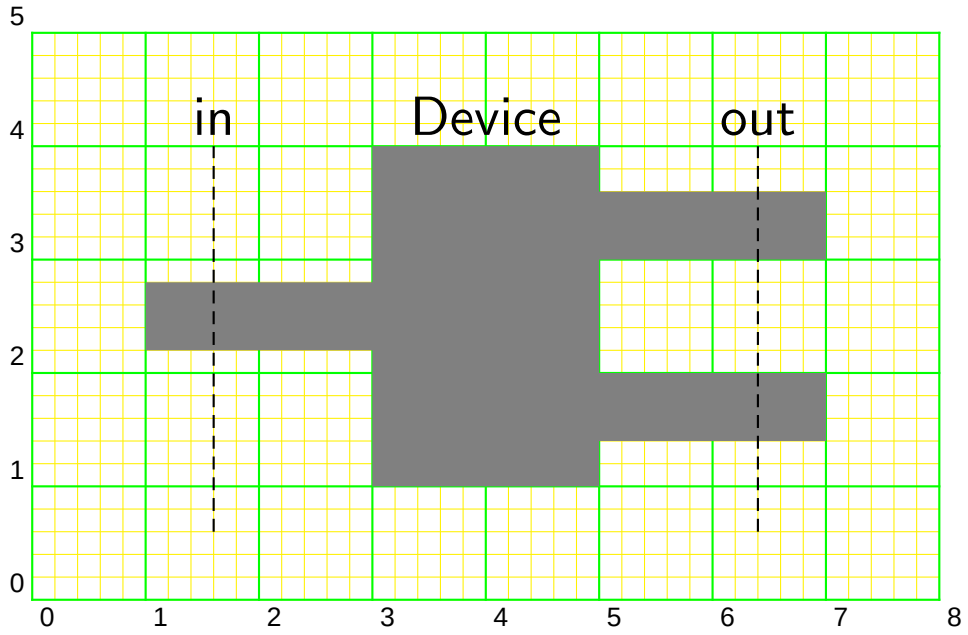
- *Many* practical advantages over existing time-domain solvers.

Example: time-domain solver



Time-domain issues include

- Input: clean excitation at input requires an auxiliary simulation
- Device: approximations required for material dispersion
- Output: overlap integrals must be repeatedly calculated *during* the simulation


in
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