Kappa Analysis and Comparison Tool

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1 Introduction

This tool provides an open-source method of closely approximating the crossover and through-port coupling coefficients for microring resonators (MRRs). It is a python based tool and uses user input from a text file to specify waveguide geometry/parameters. It includes an optional plotting parameter, which allows the user to compare the coupling coefficients to FDTD simulated data for devices with radius of 10 μm and optical wavelength of 1550nm.

2 Setup and Installation

To install, first clone or download the repository from https://github.com/RGloekler/kappa_analysis.git and ensure that you have a current installation of Python 3 and pip. To install the program dependencies, run the following line in a terminal: *pip install -r requirements.txt*. This will automatically install the proper versions of numpy, matplotlib, etc. needed to run the tool.

3 Using the Tool

To use the tool, open a command line terminal in the kappa_analysis directory. The input parameters/geometry can be changed by editing the kappa_input.txt file. After the pre-requisites are installed, the program can be run like any other python script: *python3 kappa_analysis.py*. The program can also compare its analytical model results to coupling values from FDTD simulations run at 1550nm input wavelength with 10 μm radii. To do this, add the optional *-plotR10* flag to the end of the command, and a comparison plot will be generated.