Waveguide Filter Design Toolbox

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This study proposes a simulation toolbox for rectangular waveguide filter design. The implementation of the toolbox is based on MATLAB and created a user friendly Graphical User Interface (GUI) to serve anyone not familiar with programming. In programming aspect, the code is implemented being aware of efficient performance by avoiding cumbersome iterations to have faster results. The simulation toolbox can be used for educational purposes. In addition to that, it can serve to industrial implementations in order to reduce cost, time, and prototypes.

The simulation toolbox allows user to calculate the rectangular waveguide filter design by changing the number of inductive and/or capacitive irises, the length between irises, and the thickness of the irises. Horizontal windows represent the capacitive irises and vertical windows represent the inductive irises. To start designing a rectangular waveguide filter, the inductive and capacitive irises are chosen at first. Then, each iris feature is determined by arranging the thickness and the distance. After that, the length is positioned before adding the next iris. By arranging similarly more irises can be added to calculate the analytical solution. The simulation toolbox allows users to add multiple inductive and capacitive irises. Cascading inductive and capacitive irises are not limited and depend on the user. In performance perspective, S parameters are calculated faster and wisely so that adding more irises does not have any discernable effect in performance of the simulation.

The simulation toolbox is basically guided for numerical calculations. Moreover, it provides an opportunity to select multiple features for designing a rectangular waveguide filter freely. Without simulation, designing a rectangular waveguide filter has potential to pave the way for money to waste. This simulation toolbox basically makes the complex equations to a simple model.