MATLAB SAW Filter Analysis Toolbox (SAWFAT): Structure, Organization, Algorithms, Examples

Abstract

This lecture covers the detailed description of the SAW Filter Analysis Toolbox (SAWFAT) including the directory structure and organization. SAWFAT is a collection of the software tools for comprehensive analysis of the in-line or dual-track SAW filters in the quasi-static approximation. An accurate MSC modeling can be included in the analysis of the dual-track SAW filters if necessary (optional).

Basic modeling assumption is that bidirectional SAW interdigital transducers (IDT) are supposed to be periodic and non-reflective if short-circuited (quasi-static approximation). Two-mode approach (expansion into symmetric and antisymmetric first order rectangular modes) is applied to MSC modeling.

Modeling assumptions, toolbox capabilities, software limitations, and principles of the computational algorithms are discussed in the lecture. Purpose, synopsis, argument description, algorithm, and use of the basic computational subroutines are considered.

Compiling, linking and building MEX-files that enables to call C and/or Fortran computational subroutines directly from MATLAB is discussed with the necessary information to get up and run so that one can configure his system to build MEX-functions from the supplied source codes of the gateway programs and computational subroutines.

Tutorial examples and test results are given. The format of the input data is explained. Samples of data files are given that allows the user to effectively adopt these examples to the user's needs or compose own data files for analysis of the customized SAW filters.

Contents