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Simulation of Leaky Surface Acoustic Wave Resonators using Coupling-of-Modes Theory

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Abstract : In the past few years a new class of SAW based RF filters has evolved based on the use of one port Leaky SAW (LSAW) resonators as building blocks. These SAW resonators are connected in ladder configuration to form what are called Impedance Element Filters (IEFs). These filters offer a host of desirable characteristics such as high operating frequencies, low loss, compact size and moderate power handling capability. In the present paper admittance characteristics of a single resonator element are analyzed using Coupling-of-Modes (COM) modeling technique. A Graphical User Interface based simulation tools is developed using COM theory to study the effects of geometry changes on the admittance characteristic of one port LSAW resonators on 42°YX Lithium Tantalate substrate. Simulation results are presented and analyzed. Results are also compared to those published in an earlier work.