

Master 2006

Murat Tapsin

Active Microwave Filter with Coupled Resonators

*ABSTRACT - Masterthesis*

Microwave filters with coupled resonators are significant elements of today's electronic systems. They are widely used in all branches of communication networks including cellular radio, satellite communications and radar applications.

The major disadvantages of passive coupled resonator filters are the signal attenuation and the bandwidth limitation due to the high insertion loss. By implementing an active element such as bipolar transistor, losses depending on the passive resonators can be compensated. Active element implementation allows the realization of high performance filters which are smaller in size and lower in cost.

The aim of the thesis is, to design and test a microwave bandpass filter which consists of coupled resonators and a bipolar transistor as active element. The main idea is, to design active inverter blocks which will be replaced with the passive ones in the filter configuration. The thesis includes a detailed theory an active inverter filter design based an coupling theory and microwave active filter topologies. Finally the theoretical results will be verified by hardware design examples in the S-band.