Abstracts

Suspended resonators for filters - reduced /spl lambda//sub g/ excitation of evanescent cavities using high dielectric constant feedlines (Dec. 2002 [T-MTT])

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A structure consisting of dielectric-loaded feed lines (such as surface-wave lines similar to Goubau lines) and below-cutoff air-filled cavities can be used to form essentially L-C sections. The capacitance is due to electric-field coupling from the feed-line dielectric medium into the below-cutoff section. The inductance results from combining the inductors in the inductive tee equivalent circuit for such below-cutoff sections. Dielectric loading is used to shorten the guide wavelength at the input to the evanescent section, increasing the effective input inductance. The dielectrically loaded feed lines can comprise microstrip, coplanar waveguide (CPW), coplanar stripline (CPS), Goubau lines (surface-wave structures), waveguide, etc. The resulting resonant elements are usable at frequencies below 1 GHz, with small dimensions. If connected to the common ground plane, these L-C sections act as a transmission zero. If "floated," i.e., connected in the "hot" line rather than to the ground plane, the sections form bandpass circuits (transmission poles). The air-filled below-cutoff sections (evanescent mode) are placed in a supporting low dielectric-constant medium (air, Teflon, or similar) with the open end in proximity to the dielectric portion of the feed line and are, thus, termed "suspended." The individual L-C sections can be coupled together using microstrip, surface-wave line, CPW, CPS, finline, waveguide, or lumped elements. Such combinations can be chosen to implement Chebychev, Butterworth, quasi-elliptic, etc. responses.

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