Abstracts

Mobius dual-mode resonators and bandpass filters

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It is shown that a topological surface known as the Mobius strip has applications to electromagnetic resonators and filters. Using identical rectangles to construct a cylindrical loop and a Mobius strip results in the path length of the edge of the Mobius strip being twice the path length of an edge of the cylindrical loop. This path-length advantage is consistent with the electromagnetic analog of a Mobius strip resonating at half the resonant frequency of the electromagnetic analog of the cylindrical loop even though b) they have the same mean diameter. Dual-mode Mobius resonators have been demonstrated in planar format and as wire-loaded cavities. Two-pole bandpass filters have been constructed using these resonators. It is shown that these bandpass filters possess intrinsic transmission zeros that can be adjusted to enhance filter response. An equivalent circuit, which demonstrates excellent agreement with measured data, is presented and discussed.

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