Abstracts

Four-Port YIG Filter

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The four-port YIG filter represents a new class of multifunction YIG components. This device, by proper coupling techniques, yields a reciprocal and tunable YIG filter with balanced outputs and two inputs. One input is coupled through the YIG resonator and is delivered as two equal amplitudes, 180 degrees out-of-phase signals at the balanced outputs. This signal, as it is coupled through the YIG, has a bandpass characteristic. The second input does not couple to the YIG but is split in-phase between the balanced outputs. The transmission of this signal does not involve the YIG resonance. The component thus combines the function of a tunable bandpass filter and a 180 degree hybrid junction, and so may be accordingly used. Experimental devices were built and evaluated as a combined preselector and balanced mixer, in particular, in regard to subharmonic mixing for multioctave performance. Also, the same device was evaluated as a tunable phase discriminator showing the versatility of this new component. Subharmonic mixing was evaluated using the four-port filter from 2.0 to 8.0 GHz while the discriminator, as breadboarded, was found to tune from 1.0 to 5.0 GHz with decade performance clearly feasible.

❑ Return to main document.