Abstracts

Improved tuning prediction for the microstrip coupled dielectric resonator using distributed coupling

X. Xu and R. Sloan. "Improved tuning prediction for the microstrip coupled dielectric resonator using distributed coupling." 2001 Transactions on Microwave Theory and Techniques 49.3 (Mar. 2001 [T-MTT]): 553-555.

In this paper, accurate modeling of the varactor-tuned dielectric resonator (DR) using distributed coupling between the DR and microstrip lines is investigated on the basis of three-dimensional electromagnetic study. The magnetic coupling between the DR and microstrip line is appreciable over a length greater than the diameter of the DR. The distribution of this coupling should be considered when calculating the electronic frequency tuning range. A novel circuit model is introduced to represent the coupling as distributed, with an integral method to calculate equivalent-circuit parameters efficiently. The distributed model provides much better accuracy than the conventional lumped model. A comparison is made between the calculated tuning range of 23 MHz achieved by the distributed model, which agrees closely with a measurement of 20.2 MHz, and that of 89 MHz predicted by the conventional lumped model. The circuit model of distributed coupling is, therefore, valuable in the design of DR oscillators.

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