

## **A Tuning Method for Microwave Filter via Complex Neural Network and Improved Space Mapping**

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**Abstract :** This paper presents an intelligent tuning method of microwave filter based on complex neural network and improved space mapping. The tuning process consists of two stages: the initial tuning and the fine tuning. At the beginning of the tuning, the return loss of the filter is transferred to the passband via the error of phase. During the fine tuning, the phase shift caused by the transmission line and the higher order mode is removed by the curve fitting. Then, an Cauchy method based on the admittance parameter (Y-parameter) is used to extract the coupling matrix. The influence of the resonant cavity loss is eliminated during the parameter extraction process. By using processed data pairs (the amount of screw variation and the variation of the coupling matrix), a tuning model is established by the complex neural network. In view of the improved space mapping algorithm, the mapping relationship between the actual model and the ideal model is established, and the amplitude and direction of the tuning is constantly updated. Finally, the tuning experiment of the eight order coaxial cavity filter shows that the proposed method has a good effect in tuning time and tuning precision.

**Keywords :** microwave filter, scattering parameter, coupling matrix, intelligent tuning

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