World Academy of Science, Engineering and Technology
International Journal of Mechanical and Industrial Engineering
Vol:9, No:10, 2015

Study of the Electromagnetic Resonances of a Cavity with an Aperture Using Numerical Method and Equivalent Circuit Method

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Abstract : The shielding ability of a shielding cavity is affected greatly by its resonances, which include resonance modes and frequencies. The equivalent circuit method and numerical method of transmission line matrix (TLM) are used to analyze the effect of aperture-cavity coupling on electromagnetic resonances of a cavity with an aperture in this paper. Both theoretical and numerical results show that the resonance modes of a shielding cavity with an aperture can be considered as the combination of cavity and aperture inherent resonance modes with resonance frequencies shifting, and the reason of this shift is aperture-cavity coupling. Because aperture sizes are important parameters to aperture-cavity coupling, variation rules of electromagnetic resonances of a shielding cavity with its aperture sizes are given, which will be useful for the design of shielding cavities.

Keywords : aperture-cavity coupling, equivalent circuit method, resonances, shielding equipment
Conference Title : ICIME 2015 : International Conference on Industrial and Mechanical Engineering
Conference Location : London, United Kingdom
Conference Dates : October 23-24, 2015