OVERCOMING THE ONSET OF ILL CONDITIONING AT INTERIOR RESONANCES BY USING GENERALIZED FORMULATIONS

Yehuda Leviatan and Zachi Baharav
Department of Electrical Engineering
Technion, Israel Institute of Technology
Haifa 32000, Israel

KEY TERMS

Numerical methods, electromagnetic scattering, interior resonances

ABSTRACT

Generalized formulations, in which instead of solving for the actual surface current one solves for an equivalent fictitious current flowing on a mathematical surface enclosed inside the body, have been used for analysis of many scattering problems. This article explains how inaccuracies occurring at frequencies corresponding to interior resonances of the conducting surface can be avoided by using generalized formulations. A numerical study of TM scattering by a circular cylinder at such resonant frequencies is carried out. The advantage gained by using generalized formulations instead of standard surface formulations in eliminating internal resonances is demonstrated. It is also shown that even if the shape of the interior mathematical surface, when covered by a perfect conductor, forms a resonant cavity, no problem is encountered.