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Title:Numerical solutions of the integral equation for excitation-transmission- radiation of the beam waveguide

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Abstract:The numerical method of the Integral Equation has been used to model the electromagnetic excitation, transmission, and radiation problems of the beam waveguide. The Mode Matching Method has been used to describe the impedance matching situation at the exciting aperture of the waveguide. The excitation conditions were established based on the expansion of the waveguide modes and the continuity of the tangential components of the fields. The volume-surface integral equations combined with the equavalence principle have been used to model the wave transmission in the beam waveguide. The numerical solutions of the electromagnetic transmission and aperture radiation of the waveguide have been given by using the Multilevel Fast Multipole Algorithm (MLFMA). It has been demonstrated that the method proposed by this paper is able to provide the efficient and accurate numerical solution for the excitation, propagation and radiation problems of the beam waveguide with arbitrary shape and electrically large size. © Springer Science+Business Media, LLC 2012.