A Procedure for Defining Behavior of Weight Functions Near the Edge for Best Convergence Using the Galerkin Method

A general procedure is described for determining the behavior of the weight functions (WF) near the edge so as to provide the best convergence using the Galerkin Method (GM) for calculating linear functional of the electromagnetic theory. It is believed that our procedure is proposed for the first time. The procedure is based on the equivalence of two methods of calculating such functionals the--GM and the variational method (VM). To implement the procedure the sought linear functional is expressed as a variational functional. The stationarity condition of the latter leads to some auxiliary problem. Due to the equivalence mentioned above the WF behavior near the edge is the same as that obtained from the solution of the auxiliary problem. The efficiency of the procedure i.e. high speed of convergence is illustrated by two examples: 1) calculation of the equivalent circuit shunt impedance of the capacitive diaphragm in a plane waveguide, and 2) calculation of the capacitance of a metal tube segment filled with dielectric.

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