Electromagnetic Coupling between Two Half-Space Regions Separated by Two Slot-Perforated Parallel Conducting Screens

YEHUDA LEVIATAN, MEMBER, IEEE

Abstract —The problem of electromagnetic coupling between two half-space regions separated by two slot-perforated parallel conducting planes is investigated. A general moment solution for the problem is obtained. This moment solution is then specialized to the case of narrow slots and to a TE (transverse electric to the slot axis) excitation. Attention is given to the power transmitted from one half-space to the other through the slots and to its functional dependence on various problem parameters involved.

The basic approach is to first use the equivalence principle [9, sec. 3-5] to divide the problem into three equivalent situations. We close each slot with a perfect conductor and attach magnetic current sheets to both sides of the covered slot to provide for the tangential electric field originally present in the slot region. Subsequently, we require the continuity of the tangential magnetic field across each slot