Abstracts

The Effects of Covering on Complex Wave Propagation in Gyromagnetic Slotlines

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The evolution of complex leaky waves in partially open gyromagnetic slotlines into complex modes in a shielded slotline is presented. Given a particular stratified gyromagnetic slotline with two sidewalls present, four types (Types I-IV) of guided structures are defined and investigated, depending upon the four possible combinations of top and bottom covers. The behavior of the complex solutions is discussed for the partially open gyromagnetic slotlines. Initially, the slotline of Type I, which lacks both top and bottom covers, shows that no coupling exists among various pairs of leaky waves. By adding only a top cover into Type I, the resultant slotline of Type II exhibits certain coupling between different sets of leaky waves. Similarly, by adding only a bottom cover into Type I, the resultant slotline of Type III shows that certain strong leaky waves of Types I and II now become weak leaky waves. From these numerical experiments, we deduce that the complex modes supported by Type IV, which is completely shielded, can be the result of the mode coupling of the two previously found leaky waves in Types II and III waveguides, respectively. Therefore, the formation of complex modes in shielded slotline is related to the effects of covering on mode coupling of the various leaky waves of the partially open slotlines.

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