Abstracts

Simplified Calculation of Antenna Patterns, with Application to Radome Problems

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Generally, the calculation of antenna far-field patterns from known near-field distributions is tedious and may require the use of a large computer. The calculations are simplified for certain types of antennas having separable near fields. This simplifying assumption is found to yield satisfactory results with pyramidal horns and parabolic reflector antennas. Calculations are further simplified by approximating a complex line integral with two real summations. Measured and calculated far-field patterns are included to indicate the accuracy of the calculations. Results are presented for horns and parabolic antennas and for a horn covered with a hollow dielectric wedge. The method is applicable to both E-plane and H-plane pattern calculations. The main lobe of a far-field pattern is calculated in less than one hour on a desk calculating machine by the simplified method. In radome work an important feature is that it permits rapid evaluation of the far-field distortion associated with any given near-field distortion in any given small region in the near field.

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