Abstracts

Diffraction of a Wave Beam by an Aperture

K. Tanaka, M. Shibukawa and O. Fukumitsu. "Diffraction of a Wave Beam by an Aperture." 1972 Transactions on Microwave Theory and Techniques 20.11 (Nov. 1972 [T-MTT]): 749-755.

The diffraction field of a wave beam from a circular and a rectangular aperture is obtained in the Fresnel region by using the Huygens-Kirchhoff approximation. The diffraction field in the Fraunhofer region can be obtained simply by replacing a parameter. The diffraction field is then expanded into a series of beam mode functions. From the field distributions and the expansion coefficients, which represent the coupling of the incident beam to the various modes in the diffraction field, the effects of an aperture on the incident beam can be known. With this mode expansion method, the conditions for optimum coupling between fundamental modes are obtained and solved numerically.

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