Abstracts

Transfer matrix function (TMF) for wave propagation in dielectric waveguides with arbitrary transverse profiles

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A transfer matrix function (TMF) is derived for the analysis of electromagnetic (EM) wave propagation in dielectric waveguides with arbitrary profiles, situated inside rectangular metal tubes. The TMF relates the wave profile at the waveguide output to the (arbitrary profile) input wave in the Laplace space. The TMF consists of the Fourier coefficients of the transverse dielectric profile and those of the input-wave profile. The method is applicable for inhomogeneous dielectric profiles with single or multiple maxima in the transverse plane. The TMF is useful for the analysis of dielectric waveguides in the microwave and the millimeter-wave regimes and for diffused optical waveguides in integrated optics.

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