# Determination of a dielectric waveguide propagation constant using a multifilament-current model

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A moment method using a multifilament-current model is presented to analyze the modes propagating in a cylindrical dielectric waveguide. In this model, analytically derivable fields of filamentary electric and magnetic currents (of yet unknown propagation constant and amplitude) are used to simulate the field of each mode inside and outside the guiding core. A simple point-matching procedure is subsequently used to enforce the boundary conditions at the core periphery and results in a homogeneous matrix equation. The longitudinal propagation constant of each mode and the currents that yield the field distribution of this mode are then found by solving this equation. As an example, a circular dielectric waveguide is analyzed and the results are presented.