

## **Analysis and Simulation of TM Fields in Waveguides with Arbitrary Cross-Section Shapes by Means of Evolutionary Equations of Time-Domain Electromagnetic Theory**

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**Abstract :** The boundary value problem on non-canonical and arbitrary shaped contour is solved with a numerically effective method called Analytical Regularization Method (ARM) to calculate propagation parameters. As a result of regularization, the equation of first kind is reduced to the infinite system of the linear algebraic equations of the second kind in the space of  $L_2$ . This equation can be solved numerically for desired accuracy by using truncation method. The parameters as cut-off wavenumber and cut-off frequency are used in waveguide evolutionary equations of electromagnetic theory in time-domain to illustrate the real-valued TM fields with lossy and lossless media.

**Keywords :** analytical regularization method, electromagnetic theory evolutionary equations of time-domain, TM Field

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