# Abstracts

## Phase-Plane Approach to Nonlinear Propagation in Dielectric Slab Waveguide

Considerable interest is currently being devoted to nonlinear propagation in dielectric slab waveguides for integrated optics and millimetric applications. Apart from a few specific analytical cases, much of the current work is numerically based, so that the qualitative features of the solutions are lost. In this contribution, we look at on the problem in the framework of a phase-plane approach, prior to seeking numerical solutions by, say, the Runge-Kutta method. As a result, qualitative aspects, such as "integrals of motion" in phase-plane do emerge from the analysis. Systematic consideration of these quantities narrows the range of possible solutions down whilst providing direct physical interpretation of the same. Particularly suggestive, in this respect, are the interpretations of the appearance of higher order modes and of the energy/boundary conditions constraints typical of the nonlinear problem. The approach is quite general and results will be shown in the TE and TM cases.

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