Shape of singularity lines in electromagnetic field in problems of nanophotonics and nonlinear optics

Abstract

A new algorithm based on lines representation as solutions to the Cauchy problem is developed for plotting singularity lines of electric field. The implementation of this method requires the components of the electric field vector in a certain region of space and the coordinates of the only known point of the unknown singularity line to be known. The efficiency of the method is illustrated in two problems of paraxial and nonparaxial optics. The advantages of the new algorithm include high accuracy and speed of building lines, as well as the possibility of studying the singularity line shape dependence on the parameters of the problem.