1145-35-854 **Jianliang Qian*** (jqian@msu.edu), Department of Mathematics, Michigan State University, East Lansing, MI 48824, and **Wangtao Lu** and **Robert Burridge**. *Hadamard-Babich ansatz for Maxwell's equations in inhomogeneous media.*

Starting from Hadamard's method, we extend Babich's ansatz to the frequency-domain point-source (FDPS) Maxwell's equations in an inhomogeneous medium in the high-frequency regime. First, we develop a novel asymptotic series, dubbed Hadamard's ansatz, to form the fundamental solution of the Cauchy problem for the time-domain point-source (TDPS) Maxwell's equations in the region close to the source. Governing equations for the unknowns in Hadamard's ansatz are then derived. In order to derive the initial data for the unknowns in the ansatz, we further propose a condition for matching Hadamard's ansatz with the homogeneous-medium fundamental solution at the source. Directly taking the Fourier transform of Hadamard's ansatz in time, we obtain a new ansatz, dubbed the Hadamard-Babich ansatz, for the FDPS Maxwell's equations. Next, we elucidate the relation between the Hadamard-Babich ansatz and a recently proposed Babich-like ansatz for solving the same FDPS Maxwell's equations. Finally, incorporating the first two terms of the Hadamard-Babich ansatz into a planar-based Huygens sweeping algorithm, we solve the FDPS Maxwell's equations at high frequencies in the region where caustics occur. Numerical experiments demonstrate the accuracy of our method. (Received September 16, 2018)