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Title:Theoretical investigation of a terahertz transmission line in bipolar coordinate system
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Abstract:It has been demonstrated that the dual-wire waveguide (DWW) can be used in terahertz (THz) frequency regime with many advantages. However, the existent research approaches for the DWW are based on the electrostatic theory. In this paper, making use of the bipolar coordinate system (BCS), a rigorous analytical theory of DWW is worked out, and some important physical and optical characters of DWW including the rotating behavior etc. are revealed, the equivalent impendence and the ohmic loss for the gold DWW are calculated. An eigenvalue problem is presented from the point of view of Mathematical-Physics for TE and TM modes. The obtained results will help get a deep-going understanding of DWW and explore its application in high frequency range including THz.
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