Research Article

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Modeling electrostatic potential in FDSOI MOSFETS: An approach based on homotopy perturbations

Abstract: Modeling of the electrostatic potential for fully depleted (FD) silicon-on-insulator (SOI) metal-oxide-semiconductor field effect transistor (MOSFET) is presented in this article. The modeling is based on the analytical solution of two-dimensional Poisson's equation obtained by using the homotopy perturbation method (HPM). The HPM with suitable boundary conditions results in the so-called HPM solution in general and closed-form, independent of the surface potential. The HPM solution has been applied in modeling the output characteristics of the FDSOI MOSFET, which show good agreement compared with the numerical results.

Keywords: 2D Poisson equation, electrostatic potential, FDSOI MOSFETs, HPM, surface potential

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