

Abstract

The analytical model of random variation in drain current of the Floating Gate MOSFET (FGMOSFET) has been proposed in this research. The model is composed of two parts for triode and saturation region of operation where the process induced device level random variations of each region and their statistical correlations have been taken into account. The nonlinearity of floating gate voltage and dependency on drain voltage of the coupling factors of FGMOSFET have also been considered. The model has been found to be very accurate since it can accurately fit the SPICE BSIM3v3 based reference obtained by using Monte-Carlo SPICE simulation and FGMOSFET simulation technique with SPICE. It can fit the BSIM4 based reference if desired by using the optimally extracted parameters. By using the proposed model, the variability analysis of FGMOSFET and the analytical modeling of the variation in the circuit level parameter of any FGMOSFET based circuit can be performed. So, this model has been found to be an efficient tool for the variability aware analysis and design of FGMOSFET based circuit.