Primer on the MOSFET Simulator on nanoHUB.org

The MOSFET simulator on nanoHUB.org (http://nanohub.org/resources/mosfet) simulates the equilibrium electrostatics and non-equilibrium current-voltage (I-V) characteristics of i) bulk, ii) dual-gate, and iii) SOI based fi eld efect transistors. In this chapter, we will describe: i) the structure and basic operational principle of MOSFETs; ii) the physical models used in the MOSFET simulator; iii) the graphical user interface (GUI) and how to prepare the input decks for a device with speci c geometry, numerical meshing, a set of model parameters, temperature, and biasing; iv) simulation outputs and post-processing options; and v) the limitations as well as the scopes for improvement of the simulator. The Chapter, from a classical viewpoint, is expected to help the users better understand the technologically important figures-of-merit (FOM) associated with both conventional and emerging FETs, extract the parameters of interest from the simulation results, and shed light on how to design FETs for improved performance.