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EFFECT OF SUBBANDS ENERGY IN THE CNTFET CHARACTERISTICS FOR DIFFERENT NANOTUBE DIAMETER

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Abstract:
Single-walled carbon nanotubes (CNTs) have been the subject of intense interest for basic and applied research since the first reports in 1993. Carbon nanotubes are sheets of graphene (a semi-metal) rolled into a tube. Depending on the way the sheet is rolled up (its chirality's) the CNT could be metallic or semiconducting. Interest in carbon nanotubes is driven by their exceptional electronic, optical, thermal, and mechanical properties.
Among the many remarkable properties of nanotubes, we can mention 1D character that allows a good confinement of the charges and thus a good electrostatic control, which is essential in an application type transistor C NTFET.
The band structure of the rolled-up nanotube can be obtained by zone-folding the band structure of the graphene sheet. This method is used in this work. Using the available models, we simulated electrical characteristics for different values of parameters, diameter and number the sub band "p", in order to show the effect of the number of sub bands p on the I-V characteristic. We studied also the influence of the three first sub-band energy on electrical characteristic of CNTFET when nanotube diameter (d) increases.

Key words: Sub-band energy; CNTFET, Characteristics of CNTFETs, Nanotube diameter.