Graphene Nanoribbon Conductance Model in Parabolic Band Structure

Abstract:
Many experimental measurements have been done on GNR conductance. In this paper, analytical model of GNR conductance is presented. Moreover, comparison with published data which illustrates good agreement between them is studied. Conductance of GNR as a one-dimensional device channel with parabolic band structures near the charge neutrality point is improved. Based on quantum confinement effect, the conductance of GNR in parabolic part of the band structure, also the temperature-dependent conductance which displays minimum conductance near the charge neutrality point are calculated. Graphene nanoribbon (GNR) with parabolic band structure near the minimum band energy terminates Fermi-Dirac integral base method on band structure study. While band structure is parabola, semiconducting GNRs conductance is a function of Fermi-Dirac integral which is based on Maxwell approximation in nondegenerate limit especially for a long channel.