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# Application of the Micropolar Beam Theory for the Construction of the Discrete-Continual Model of Carbon Nanotubes

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**Abstract :** Together with the study of electron-optical properties of nanostructures and proceeding from experiment-based data, the study of the mechanical properties of nanostructures has become quite actual. For the study of the mechanical properties of fullerene, carbon nanotubes, graphene and other nanostructures one of the crucial issues is the construction of their adequate mathematical models. Among all mathematical models of graphene or carbon nano-tubes, this so-called discrete-continuous model is specifically important. It substitutes the interactions between atoms by elastic beams or springs. The present paper demonstrates the construction of the discrete-continual beam model for carbon nanotubes or graphene, where the micropolar beam model based on the theory of moment elasticity is accepted. With the account of the energy balance principle, the elastic moment constants for the beam model, expressed by the physical and geometrical parameters of carbon nanotube or graphene, are determined. By switching from discrete-continual beam model to the continual, the models of micropolar elastic cylindrical shell and micropolar elastic plate are confirmed as continual models for carbon nanotube and graphene respectively.

**Keywords :** carbon nanotube, discrete-continual, elastic, graphene, micropolar, plate, shell
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