Abstract Submitted
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Some Comments on the Mathematical Analysis of the Mechanical Properties of Graphene R.E. MICKENS, XIAO-QIAN WANG, MICHAEL WILLIAMS, Clark Atlanta University — Graphene sheets have mechanical properties which may be modeled using the classical theory of plates [1]. To obtain the associated mechanical parameters, data is fitted to the solutions of these mathematical models. While the fundamental equations are PDE's, an averaging over the space variables result in an ODE for which time is the independent variable. This ODE is the Duffing equation which describes1-dim, nonlinear oscillations. While the coefficients of this equation are constant, their explicit values depend on the functional form assumed for the fundamental mode of the grapheme sheet and other issues such as the particular functions used for the damping/dissipative terms. This work focuses on the coefficients of the derived Duffy equation and examines how their values are modified by selection of different functional forms for the fundamental mode.

[1] A. Eichler et. Al., "Nonlinear damping in mechanical resonators made from carbon nanotubes and grapheme," NATURE Nanotechnology, Vol. 6 (June 2011), 339-342.

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