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COMMENTS ON "AXIAL VIBRATION OF DOUBLE-WALLED CARBON NANOTUBES USING DOUBLE-NANOROD MODEL WITH VAN DER WAALS FORCE UNDER PASTERNAK MEDIUM AND MAGNETIC EFFECTS [VIETNAM JOURNAL OF MECHANICS, VOL.44, NO.1 (2022), PP. 29-43]"

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First of all Sentilkumar has to be congratulated for his paper [1]. In the paper, the author presented the vibration of double walled carbon nanotubes. He claimed that the equations of motion given in [2] are incorrect. The aim of this communication is to clarify this issue. The equations of motion given in [2] are

$$c'\left(u_2-u_1\right)-\mu c\left(\frac{\partial^2 u_2}{\partial x^2}-\frac{\partial^2 u_1}{\partial x^2}\right)=-EA_1\frac{\partial^2 u_1}{\partial x^2}+\rho\frac{\partial^2 u_1}{\partial t^2}-\rho\mu\frac{\partial^4 u_1}{\partial t^2\partial x^2}, \tag{1}$$

$$c'\left(u_1-u_2\right)-\mu c\left(\frac{\partial^2 u_1}{\partial x^2}-\frac{\partial^2 u_2}{\partial x^2}\right)=-EA_2\frac{\partial^2 u_2}{\partial x^2}+\rho\frac{\partial^2 u_2}{\partial t^2}-\rho\mu\frac{\partial^4 u_2}{\partial t^2\partial x^2}. \tag{2}$$

For classical elasticity nonlocal term $\mu = 0$ and Eqs. (1)–(2) take the form

$$c'\left(u_2-u_1\right)=-EA_1\frac{\partial^2 u_1}{\partial x^2}+\rho\frac{\partial^2 u_1}{\partial t^2}, \tag{3}$$

$$-c'\left(u_2-u_1\right)=-EA_2\frac{\partial^2 u_2}{\partial x^2}+\rho\frac{\partial^2 u_2}{\partial t^2}, \tag{4}$$

where u_i are the displacement of the tubes, E is the Youngs modulus, t is time, c' van der Waals coefficient and ρ is the mass per unit length. A dimensional analysis of the first term on the right hand side of any equations of (3) or (4) gives (kg/s^2). Recalling that ρ is mass per unit length (kg/m) the dimesion of the second term on the right hand side is also (kg/s^2). So the equations given in Eqs. (3)–(4) and in Eqs. (18) of Ref. [2] are correct and identical to equations (3) and (4) of [1]. It seems that the author of [1] considered the ρ as mass per unit volume (although he did not define it in [1]). Therefore the method developed and results given in Ref. [2] are correct for the considered assumptions mentioned in Ref. [2].

After careful reading of Ref. [1] some confusions are observed. If two tubes are coupled one can not speak for frequencies of first nanotube and second nanotube. For the problem considered in Ref. [1] and Ref. [2] there are two possibilities.

(i) Two tubes deform with different displacements ($u_1 \neq u_2$). It means that there is a relative displacement between tubes. This problem is considered in Ref. [2] for the nonlocal elasticity case.

(ii) Two tubes move with the same displacement ($u_1 = u_2$). It means there is no relative displacement. In this case, two tubes move together with the same displacement. This problem is trivial and identical to any classical single rod vibration problem.

In both of these cases one can not speak about the frequency of the first tube or frequency of the second tube as claimed and given in Table 2 and Table 3 of Ref. [1].

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