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Using the nanostructured Ti tube as an arterial vessel in the human body

The Schwarzian derivative method is applied to solve the equations of motion of the blood flow in nanostructured Ti tube in (1+1) D. The propagation of solitary wave train for the thickness of the nanotube, the blood flow velocity, the corresponding blood pressure and solitonic waves has been studied. The resulting figures are physically and physiologically consistent with the Aorta of human body. It might be applicable in the predictions of cardiovascular events. A comparison between our models with other models was performed in order to develop an analytical tool to address some of these limitations by considering the interaction between the fluid mehanics of the blood and the solid mechanics of the Ti tube.

Summary

Nanostructured Ti and Ti alloys exhibit a unique combination of strength and biocompatibility, which enables their use in medical applications and accounts for their extensive use as implant materials in the last 60 years. In this work we investigate the effect of aortic aneurysm in the aortic waves using analytical solution model. We solved non-linear partial differential equations (NLPDEs) using the Schwarzian derivative method to solve a system of NLPDE's, various patterns are resulted. The used method of solution revealing the patterns for the aortic aneurysm allows for the investigation of these types of waves, which are important for the predictions of the characteristics of cardiovascular events.

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