Type: Minisymposium Contribution

The Westervelt-Rayleigh-Plesset model of ultrasound contrast imaging with microbubbles

Wednesday, August 14, 2024 3:00 PM (30 minutes)

In ultrasound imaging, microbubbles are increasingly being used to improve image resolution. Ultrasound propagation through a bubbly liquid can be modeled using a nonlinear acoustic wave equation for the acoustic pressure coupled to a singular second-order ordinary differential equation for bubble dynamics. Additionally, the wave equation may involve time-fractional dissipation to capture the attenuation of acoustic waves in tissue media. In this talk, we will discuss these modeling aspects and then focus on the well-posedness analysis of a possible resulting system consisting of the (non)local Westervelt equation and the Rayleigh-Plesset equation. Numerical experiments will illustrate the single bubble dynamics and the interaction of the microbubbles and ultrasound waves. The talk is based on joint work with Teresa Rauscher (University of Klagenfurt, Austria).

Author: NIKOLIC, Vanja (Radboud University)

Co-author: Mrs RAUSCHER, Teresa (University of Klagenfurt)

Presenter: NIKOLIC, Vanja (Radboud University)

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