GRADUATE STUDENT RESEARCH SEMINAR SERIES (2017)

PHYSIOLOGY SIMULATION COUPLED EXPERIMENT: A HIGH FIDELITY HARDWARE-IN-THE-LOOP HYBRID MODEL FOR THE CIRCULATION

SPEAKER: MASOUD FARAHMAND

Hardware-in-loop technique (HIL) is a useful tool for investigating cardiovascular biomechanics. However, previous attempts of HIL models are associated with problems in feedback control due to physical limitation of real time actuation and measurements. In this study, we introduce a HIL framework exploiting the periodic nature of cardiovascular dynamics. This mitigates limitations in hydraulic experiments including measurement noise, signal delays due to the wave propagation or signal bandwidth, and sensor response time. The new framework integrates a computational physiology model with an experimental model using an iterative coupling algorithm. The application of this tool is to improve the design of medical devices, investigate their behavior in a realist situation, and their impact on cardiovascular dynamics.

MONDAY, OCTOBER 9 AT 3:00-4:00 PM

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