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**A reduced order model for fluid-structure interaction of thin shell structures conveying fluid for physiological applications** GARY HAN CHANG, YAHYA MODARRES-SADEGHI, Univ of Mass - Amherst — In this work, a reduced-order model (ROM) is constructed to study fluid-structure interaction of thin shell structures conveying fluid. The method of snapshot Proper Orthogonal Decomposition (POD) is used to construct the reduced-order bases based on a series of CFD results, which then are improved using a QR-factorization technique to satisfy the various boundary conditions in physiological flow problems. In the process, two sets of POD modes are extracted: those due to the shell wall's motion and those due to the pulsatile flow. The Modal Assurance Criterion (MAC) technique is used for selecting the final POD modes used in the reduced-order model. The structure model is solved by Galerkin's method and the FSI coupling is done by adapting a coupled momentum method. The results show that the dynamic behavior of thin shells conveying fluid is closely related to the distribution of the shell's Gaussian curvature, the existence of imperfections and the physiological flow conditions. This method can effectively construct a computationally efficient FSI model, which allows us to examine a wide range of parameters which exist in real-life physiological problems.

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