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Flow Dynamics in a Coupled Circulatory-Respiratory System
CAROLYN KAPLAN, ANNE STAPLES, ELAINE ORAN, K. KAILASANATH, JAY BORIS, Naval Research Laboratory — We describe simulations of flow in a network of fluid channels that represent a coupled circulatory and respiratory system. Each channel is one-dimensional and can have a variable cross sectional area. The circulatory flow is driven by a sinusoidal pressure pulse triggered by a chemical signal based on the oxygen content in the blood. Space and time scales are calibrated to the properties of an average person. We discuss the effects of branching (increasing the numbers of interconnected channels) and varying the strength and frequency of perturbations from the mean.

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