

Linear Network Models Related to Blood Flow

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This work uses differential equations on graphs as a basis for analytic and computational models of blood flow in the human arterial system. A significant issue is the geometric complexity of peripheral arterial subsystems, which have roughly 10^8 arterioles and 17 levels of branching. The current focus is on energy conserving models defined on radial trees. A reduction to radially symmetric functions facilitates the selection of appropriate junction conditions, the asymptotic analysis of solutions to eigenvalue equations at the end of the tree, and the construction of resolvents and other elements of spectral analysis.