

Arterial Blood Flow Model: Test Cases

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September 17, 2025

1 Macrovasculature Blood Flow Model

All simulations use a reflective boundary condition where outflow is defined by a reflective coefficient R_t ,

$$W_b = -W_f R_t. \quad (1)$$

where, $0 \leq R_t \leq 1$ and $W_{f,b}$ are the forward and backward propagating characteristics.

1.1 Gaussian Wave in a Continuous Artery

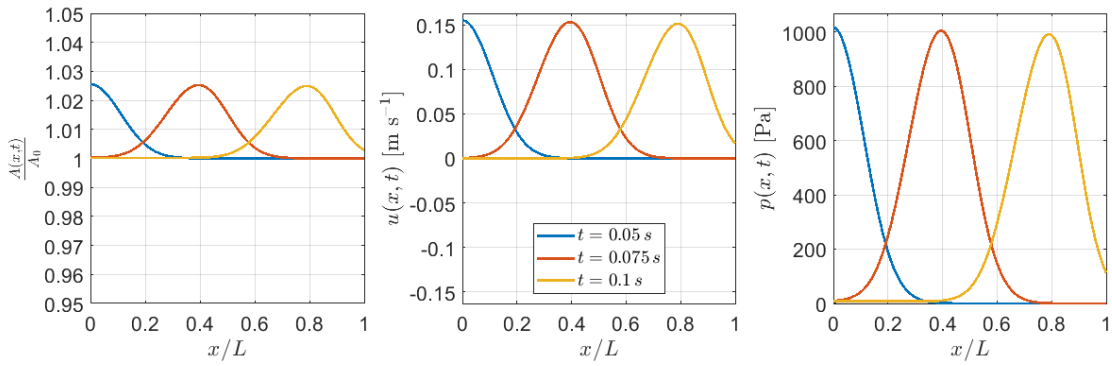


Figure 1: Three time steps presenting the change in area, velocity, and pressure across the vessel's length for the continuous case.

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1.2 Gaussian Wave in an Expanding Artery

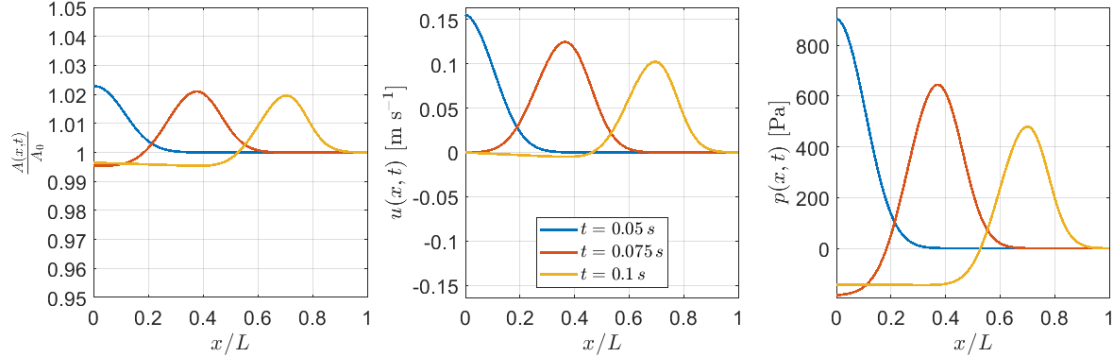


Figure 2: Three time steps presenting the change in area, velocity, and pressure across the vessel's length for the expanding case.

1.3 Gaussian Wave in a Tapered Artery

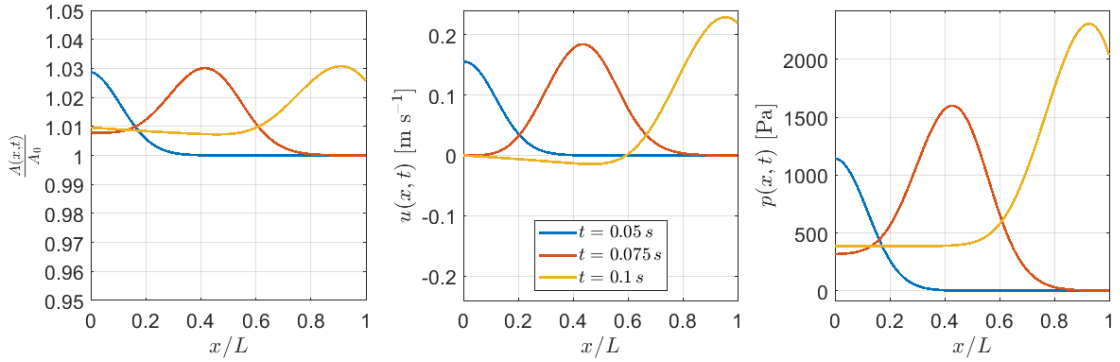


Figure 3: Three time steps presenting the change in area, velocity, and pressure across the vessel's length for the tapered case.

1.4 Gaussian Wave in a Partially Narrowed Artery

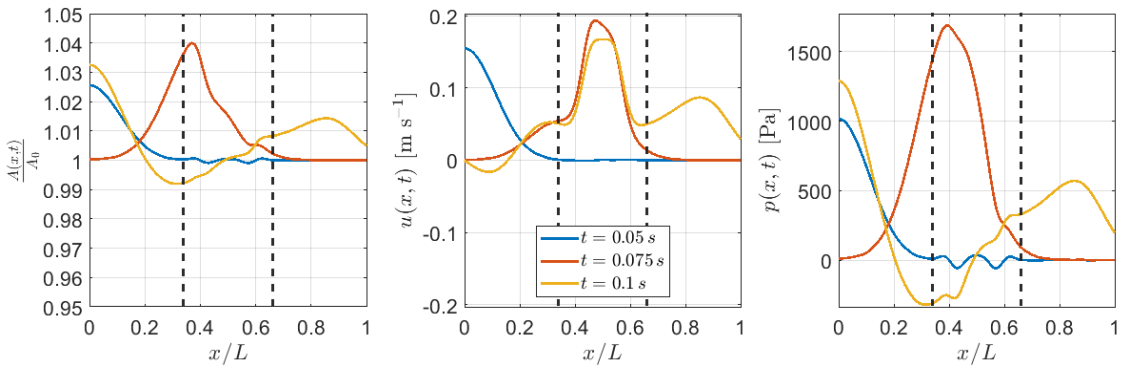


Figure 4: Three time steps presenting the change in area, velocity, and pressure across the vessel's length for the partially narrowed case.

1.5 Gaussian Wave in a Partially Stiffened Artery

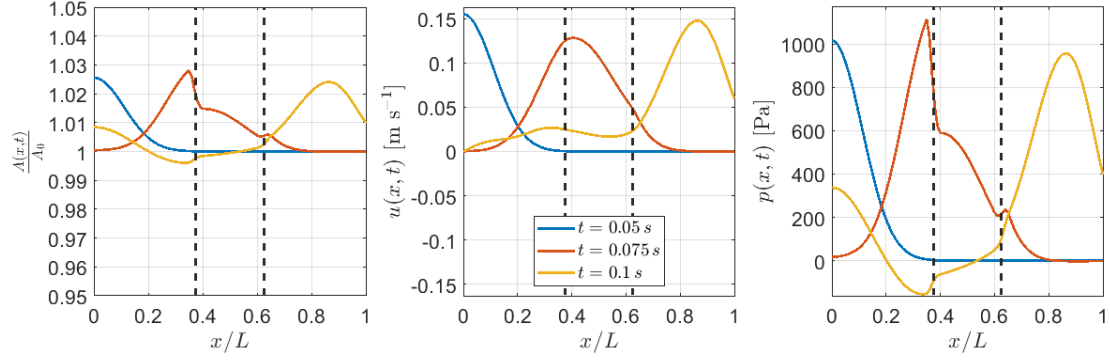


Figure 5: Three time steps presenting the change in area, velocity, and pressure across the vessel's length for the partially stiffened case.

1.6 Gaussian Wave in a Stenotic Artery

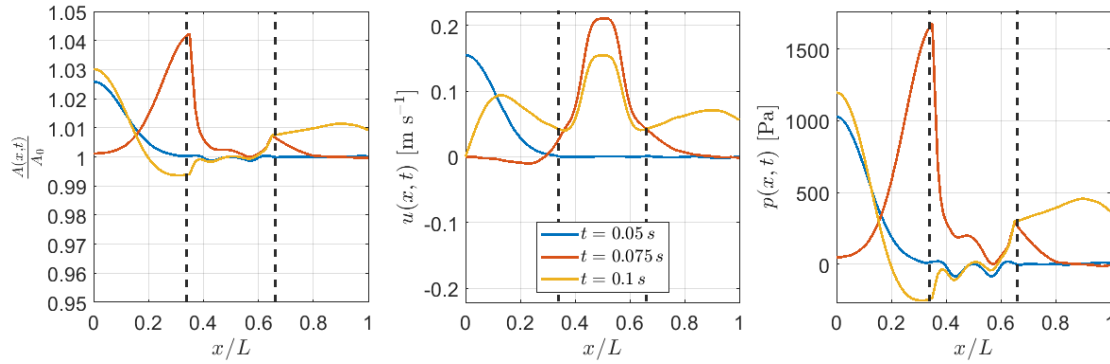


Figure 6: Three time steps presenting the change in area, velocity, and pressure across the vessel's length for the stenotic case.

1.7 Gaussian Wave in a Singly Splitting Arterial Network

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1.8 Gaussian Wave in a Singly Merging Arterial Network

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1.9 Heartbeat Cycle in a Full Arterial Network

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