# Supplemental Information

## Numerical Considerations for Advection-Diffusion Problems in Cardiovascular Hemodynamics

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### Three-element Windkessel values used for Aortic Model

| **Branch** | **Proximal Resistance** ($g/(mm^4 \cdot s)$) | **Capacitance** ($mm^4 \cdot s^2/g$) | **Distal Resistance** ($g/(mm^4 \cdot s)$) |
|---|---|---|---|
| RSA | 0.19 | 0.15 | 2.29 |
| REC | 0.63 | 0.11 | 7.09 |
| LEC | 0.28 | 0.10 | 3.28 |
| TA | 0.01 | 5.18 | 0.22 |
| LSA | 0.18 | 0.15 | 2.27 |
| LIC | 0.19 | 0.18 | 2.36 |
| RIC | 0.17 | 0.23 | 2.19 |
| RVA | 0.54 | 0.09 | 6.03 |
| LVA | 0.44 | 0.07 | 4.80 |

RSA- Right subclavian artery
REC - Right external carotid artery
LEC - Left external carotid artery
TA -Thoracic Aorta
LSA- Left subclavian artery
LIC- Left internal carotid artery
RIC- Right internal carotid artery
RVA- Right vertebral artery
LVA- Left vertebral artery

**Supplemental Video Description:**
The video shows one scalar being advected over 4 cardiac cycles in the aortic domain. A Dirichlet value of 10 was prescribed at the inlet, zero diffusive flux was specified at all walls, and the consistent flux boundary condition was prescribed at the 9 outlets. DC stabilization was used to obtain the scalar solution. The same flow boundary and initial conditions were used as previously described in Section 3.2.