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Correction

Correction to "Eye2Heart : A reduced mathematical model bridging cardiovascular and ocular hemodynamics" [*Mathematical Biosciences and Engineering* 23(2) (2026) 421–448]

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A correction on

Eye2Heart : A reduced mathematical model bridging cardiovascular and ocular hemodynamics [*Mathematical Biosciences and Engineering* 23(2) (2026) 421–448].

We correct an error in the model schematic in Figure 1 and typographical errors in six equations in Appendix C of the original article [1]. The simulation code used to generate the published results already implemented the correct model. These corrections therefore do not affect the results or conclusions of the article.

Figure 1.

The branch representing the time-varying elastance and volume of the right ventricle should connect to the right-ventricular pressure node P_{RV}, upstream of R_{RV}. This connection mirrors the corresponding arrangement for the left ventricle.

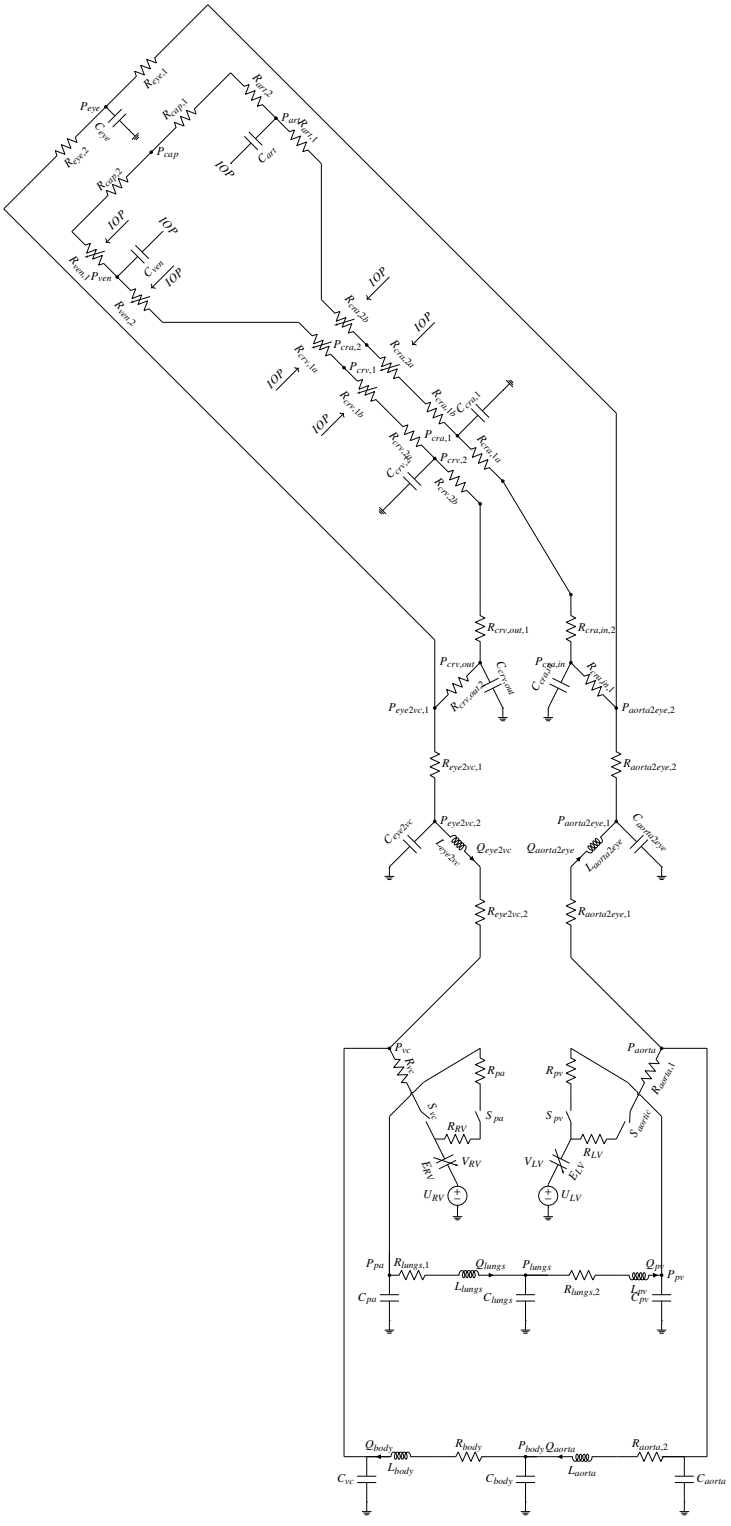


Figure 1. Model schematic of the EYE2HEART closed loop circuit. Variable resistances and capacitors are marked with arrows.

Appendix C.: Model equations

The following corrections use the original equation numbering.

- (C.1) The denominator of the aortic valve flow term is $R_{\mathrm{LV}} + R_{\mathrm{aorta},1}$:

$$\frac{\mathrm{d}P_{\mathrm{aorta}}}{\mathrm{d}t} = \frac{1}{C_{\mathrm{aorta}}}\left(\frac{(P_{\mathrm{LV}} - P_{\mathrm{aorta}})S_{\,\mathrm{aorta}}}{R_{\mathrm{LV}} + R_{\mathrm{aorta},1}} - Q_{\mathrm{aorta2eye}} - Q_{\mathrm{aorta}}\right).$$

- (C.6) The pressure difference driving right-ventricular inflow is $P_{\mathrm{VC}} - P_{\mathrm{RV}}$:

$$\frac{\mathrm{d}V_{\mathrm{RV}}}{\mathrm{d}t} = \frac{(P_{\mathrm{VC}} - P_{\mathrm{RV}})\,S_{\,\mathrm{VC}}}{R_{\mathrm{VC}}} - \frac{(P_{\mathrm{RV}} - P_{\mathrm{PA}})\,S_{\,\mathrm{PA}}}{R_{\mathrm{RV}} + R_{\mathrm{PA}}}.$$

- (C.9) The compliance in the prefactor is C_{lungs}:

$$\frac{\mathrm{d}P_{\mathrm{lungs}}}{\mathrm{d}t} = \frac{1}{C_{\mathrm{lungs}}}\left(Q_{\mathrm{lungs}} - Q_{\mathrm{PV}}\right).$$

- (C.11) The pulmonary venous pressure balance is

$$\frac{\mathrm{d}P_{\mathrm{PV}}}{\mathrm{d}t} = \frac{1}{C_{\mathrm{PV}}}\left[Q_{\mathrm{PV}} - \frac{(P_{\mathrm{PV}} - P_{\mathrm{LV}})S_{\,\mathrm{PV}}}{R_{\mathrm{PV}}}\right].$$

- (C.19) The denominator of the inflow term is $R_{\mathrm{art},2} + R_{\mathrm{cap},1} + R_{\mathrm{cap},2} + R_{\mathrm{ven},1}$:

$$\frac{\mathrm{d}P_{\mathrm{ven}}}{\mathrm{d}t} = \frac{1}{C_{\mathrm{ven}}}\left(\frac{P_{\mathrm{art}} - P_{\mathrm{ven}}}{R_{\mathrm{art},2} + R_{\mathrm{cap},1} + R_{\mathrm{cap},2} + R_{\mathrm{ven},1}} - \frac{P_{\mathrm{ven}} - P_{\mathrm{CRV},2}}{R_{\mathrm{ven},2} + R_{\mathrm{CRV},1a} + R_{\mathrm{CRV},1b} + R_{\mathrm{CRV},2a}}\right).$$

- (C.20) The compliance in the prefactor is $C_{\mathrm{CRV},2}$:

$$\frac{\mathrm{d}P_{\mathrm{CRV},2}}{\mathrm{d}t} = \frac{1}{C_{\mathrm{CRV},2}}\left(\frac{P_{\mathrm{ven}} - P_{\mathrm{CRV},2}}{R_{\mathrm{ven},2} + R_{\mathrm{CRV},1a} + R_{\mathrm{CRV},1b} + R_{\mathrm{CRV},2a}} - \frac{P_{\mathrm{CRV},2} - P_{\mathrm{CRVout}}}{R_{\mathrm{CRV},2b} + R_{\mathrm{CRVout},1}}\right).$$

References

1. L. Sala, M. Zaid, F. Hughes, M. Szopos, V. H. Huxley, A. Harris, G. Guidoboni, and S. Lapin, Eye2Heart: A reduced mathematical model bridging cardiovascular and ocular hemodynamics, *Math. Biosci. Eng.*, **23** (2026), 421–448. https://doi.org/10.3934/mbe.2026017.



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