

Abstract Submitted
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Reduced-order models of the coagulation cascade¹ KIRK B. HANSEN, SHAWN C. SHADDEN, University of California, Berkeley — Previous models of flow-mediated thrombogenesis have generally included the transport and reaction of dozens of biochemical species involved in the coagulation cascade.² Researchers have shown, however, that thrombin generation curves can be accurately reproduced by a significantly smaller system of reactions.³ These reduced-order models are based on the system of ordinary differential equations representative of a well-mixed system, however, not the system of advection-diffusion-reaction equations required to model the flow-mediated case. Additionally, they focus solely on reproducing the thrombin generation curve, although accurate representation of certain intermediate species may be required to model additional aspects of clot formation, e.g. interactions with activated and non-activated platelets. In this work, we develop a method to reduce the order of a coagulation model through optimization techniques. The results of this reduced-order model are then compared to those of the full system in several representative cardiovascular flows.

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²K. Leiderman and A.L. Fogelson, *Math Med Biol* **28**(1), 47–84 (2010).

³R. Wagenvoort, P.W. Hemker, and H.C. Hemker, *J Thromb Haemost* **4**(6), 1331–1338 (2006).

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