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Title:

On the Unification of Cardiac Mechanics and Electrophysiology by the Immersed Boundary Method*

Abstract:

The immersed boundary method was introduced for studying flow patterns around heart valves, and has since been applied to computer modeling of fluid-structure interaction in the heart as a whole. Unexpectedly, there is a formal analogy between the equations of cardiac mechanics and the bidomain equations of cardiac electrophysiology, and this leads to a generalization of the immersed boundary method that can be used to formulate and solve the dynamical equations of a combined electrical, mechanical, and fluid-mechanical model of the heart.

*Joint work with Boyce Griffith and David McQueen