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| **Abstract:** |  |
| Efficient numerical simulation of cardiac electrophysiology is crucial for studying the electrical properties of the heart tissue. The cardiac bidomain model is the most widely accepted representation of the electrical behavior of the heart muscle. The bidomain model offers fast cardiac potential variation, which can lead to high computational cost due to the required large grid sizes and small-time steps. In this paper, the complexity of the finite difference approximation of the bidomain equations is reduced with the model order reduction technique. Proper orthogonal decomposition, a projection-based algorithm, is used to efficiently approximate the original high fidelity cardiac bidomain model with a low-dimensional system of equations. The low-dimensional basis functions are computed first from the ‘snapshots,’ which contain the solutions of the full-order system for different temporal and spatial parameters. Galerkin projection of the original cardiac bidomain system onto the subspace of the reduced order basis functions reduces the size of the linear system. Numerical results confirm the efficiency of the proposed reduced order modeling technique, reducing the simulation time by a factor of 9.54, while maintaining an RMS error of 0.769 mV between the original full order solution and the reduced order POD solution. | |