In this paper, we present the numerical solution for the PDE-constrained optimization problem arises in cardiac electrophysiology. The monodomain model, which is a well-established model for simulating electrical behavior of the cardiac tissue, appears as the constraint in our problem. Our objective is to search for the optimal applied current, which is able to dampen out the excitation wavefront of the transmembrane potential during defibrillation process. The modified Dai-Yuan nonlinear conjugate gradient method is employed for computing the optimal applied current, and our numerical results show that the excitation wavefront is successfully dampened out by the optimal applied current.

References

Numerical Solution for PDE-Constrained Optimization Problem in Cardiac Electrophysiology


Index Terms

Computer Science

Keywords

Monodomain Model  Operator Splitting  Optimal Control