An analysis of the single moving dipole source for electrocardiography inverse problem

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Abstract: The electrocardiogram inverse problem is a non-linear and ill-posed problem for which it is very difficult to find an exact solution. In this paper, we presented an efficient and robust method to solve this problem. The heart activity is modeled by a single moving dipole and the human body is considered as finite volume conductor constructed based on an anatomic atlas. For solution method, finite element method is applied to the forward problem. The volume conductor is meshed into arbitrary triangular elements. The efficiency of the methods stems from the employment of genetic algorithm for minimization of difference between the measured potentials and the calculated potentials generated from a predicted dipole source. Finally, the algorithm is successfully tested with simulation model and used to estimate dipole source for real data obtained from 31 electrodes on body surface. As a result, the equivalent dipole always moves clockwise and its direction changes counterclockwise. ??2008 IEEE.

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