ELECTROCARDIOGRAPHIC INVERSE VALIDATION STUDY: MODEL DEVELOPMENT AND METHODOLOGY

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Recently, a new algorithm to solve the inverse problem of electrocardiology has emerged (G Huiskamp and F Greensite, "A new method for myocardial activation imaging", *IEEE Trans. Biomed. Eng.*, **44**:433-446, 1997). This algorthim is based in terms of the underlying cardiac activation sequence rather than in terms of epicardial potentials. Our aim was to develop an experimental paradigm to validate the accuracy of this algorithm in the pig.

This paradigm was based on concurrently recording epicardial and body surface potentials in an anaesthetised pig. The measured activation sequence was compared to the predicted activation sequence from thr inverse algorithm in a computational pig torso model.

To obtain the computational pig torso model a pig was placed in a CT scanner. From the resultant images the endocardial, epicardial, right and left lung, muscle and skin surfaces were identified. A high-order C^1 continuous mesh based on cubic Hermite elements was fitted to the surfaces using a non-linear fitting procedure. This model was used to investigate the algorithm of Huiskamp and Greensite which has been formulated with transfer matrices constructed from a boundary problem view point. Initial simulation studies with this algorithm ar rpresented. Studies with experimental data are presented in an accompanying abstract Nash *et al.*, "Electrocardiographic Inverse Validation Study: *In-vivo* Mapping and Analysis".