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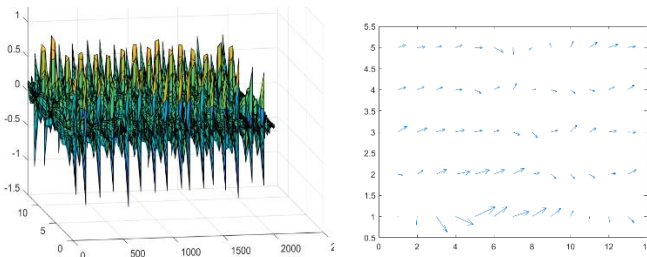
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Background

Studying the musculature of humans in a non-invasive way is still a big part of research. It is used in the fields of medicine, rehabilitation and sport science. This is done with high-density electrode matrices that are stuck to the surface of the skin and record electrical potentials of muscle contraction. The examination of the muscle fibre conduction velocity provides information about the type of muscle fibre and any diseases that may be present.



Problem

Until now, the calculation has been carried out using a cross-correlation of time-dependent signals, which does not take into account the direction of the fibres and therefore only provides limited physiological results. For example, if the fibre is vertical to the electrodes, the velocity approaches infinity. For this reason, it is necessary to include the fibre direction in the calculation.

Tasks

- Literature research
- Development of approaches to consider the fibre direction (gradient, eigenvectors...)
- Implementation in Matlab
- Validation of the methodology

Requirements

- Basic understanding of physiological processes
- Advanced knowledge in the field of vector analysis
- Programming skills (Preferred in Matlab)
- Independent and creative way of working
- Very good knowledge of German and English

Knowledge gain

- Working with real experimental data sets
- Developing a novel approach
- Programming
- Interaction in a scientific context
- Scientific work
- Possibility of scientific publication upon successful completion