

Advances in Computational Mechanics

Einladung zum Vortrag

Biophysical modeling of cardiac function for clinical applications

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Biophysical modeling has great potential in clinical applications such as in computer assisted therapy planning and diagnosis. Within this framework, parameter estimation provides a way of coupling between a model and measured data to increase the model predictivity. A successful parameter estimation using real data relies on a good balance between the type of data, model complexity and data assimilation techniques. Some particular aspects of data-model coupling in a real data scenario will be addressed during this seminar.

On the data side, cardiac MRI acquisition will be introduced. First, some "routine" sequences which have already been successfully applied in the parameter estimation framework will be presented. Some specific issues of the acquisition and post-processing will be discussed. As advanced cardiac MRI techniques, the 4D flow and tagged MRI sequences (2D and 3D) will be presented particularly with their perspectives within the modeling and estimation frameworks.

In data assimilation, reduced order unscented Kalman filtering and machine learning methods will be applied to estimate myocardial contractility and stiffness in subjects with a decreased contractility either due to pathological state (myocardial infarction) or due to a pharmacological intervention (cardiac specific beta blocker).

Finally, a prototype example of application of biophysical modeling in Cardiac Resynchronization Therapy planning will demonstrate the capability of the modeling methods in medicine and the current state state of the art.

Dienstag, 29.07.2014
IAS - Auditorium

16:30 Uhr
Lichtenbergstraße 2 a, 85748 Garching

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