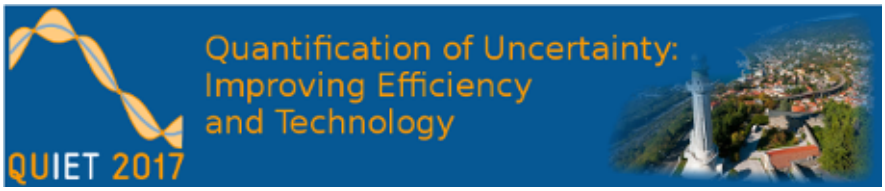

Modeling variability in cardiac electrophysiology

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Many phenomena are modeled by deterministic differential equations, whereas the observation of these phenomena, in particular in life science, exhibit an important inter-subject variability. We will address the following question: how the model can be adapted to reflect the variability observed in a population?

We will present a non-parametric and non-intrusive procedure based on offline computations of the deterministic model [1]. The algorithm infers the probability density function of uncertain parameters from the matching of the observable statistical moments at different points in the physical domain. This inverse procedure is improved by incorporating a point selection algorithm that both reduces its computational cost and increases its robustness.

The method will be illustrated for different models, based on Ordinary or Partial Differential Equations. In particular, applications to experimental data sets in cardiac electrophysiology will be presented.

References

[1] J.-F. Gerbeau, D. Lombardi, and E. Tixier. A moment-matching method to study the variability of phenomena described by partial differential equations. *Preprint hal-01391254*, 2016. `https://hal.archives-ouvertes.fr/hal-01391254`.