Incorporating prior knowledge into Gaussian process models

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Abstract:

Gaussian processes (GP) models form an emerging methodology for modelling nonlinear dynamic systems which tries to overcome certain limitations inherent to traditional methods such as e.g. neural networks, fuzzy models or local model networks.

The GP model seems promising for three reasons. First, less training parameters are needed to parameterize the model. Second, the variance of the model's output depending on the training data positioning is obtained. Third, prior knowledge about the system can be included in the model. This prior knowledge can be in the form of linear local models, statical characteristic, known hysteresis, noise prior knowledge or various other forms.

In the paper some of the possibilities of the prior knowledge incorporation will be presented together with illustrative examples.