NEURAL NETWORKS IN A MULTISCALE SIMULATION OF CONCRETE

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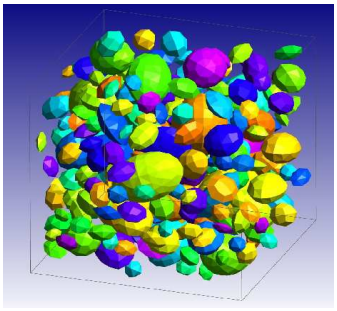

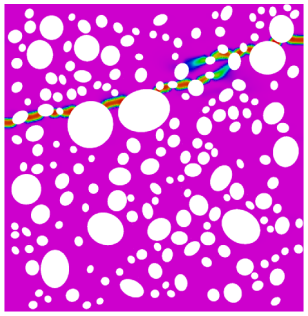

Investigation of problems within a mesoscale analysis offers the possibility to model the actual physical problems on a lower scale thus avoiding the phenomenological ”smeared”approach of a pure macroscale model. In general, this approach is computationally much more expensive and inappropriate for most realistic problems. As an example, a mesoscale analysis of concrete considering agreggates, matrix and interfacial transition zone are presented as illustrated for a tensile test. The determination of the material parameters is difficult, since the relation between the macroscopic experimentals results (e.g.the load-displacement curve for a tensile test) and the material parameters is very complex. A general procedure based on Bayesian neural networks is used to identify the material parameters of the mesoscale model for a tensile test. The main advantage of the method is that additional information about the accuracy of the prediction is obtained. A second problem is the large computational effort required for mesoscale models. In order to render the approach possible for large-scale structures, the mesoscale models are used to train a neural network, which serves as a material model on the macroscale. The presentation covers the following topics:

- Mesoscale model of concrete
- Approximation of material response using neural networks and support vector machines
- Inverse parameter identification by Bayesian neural networks

*Přednáška **v angličtině** se koná ve čtvrtek 12.6.2008 od 10 hodin ve velké zasedací síni děkana (místnost B 169) v budově Stavební fakulty ČVUT v Praze, Thákurova 7, Dejvice. **Všichni zájemci jsou srdečně zváni.** Podrobnější informace poskytne Prof. Milan Jirásek, tel. 224 354 481, Milan.Jirasek@fsv.cvut.cz .*