

Automated Solution of Equations with Uncertain Parameters

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Mathematical modeling allows prediction of the future characteristics of engineering structures without performing expensive experiments. In many cases it is hard to get exact values of the parameters p necessary to specify mathematical model. If only limited information is available sometimes it is possible to obtain upper \bar{p} and lower bound \underline{p} of the parameter p (i.e. $p \in [\underline{p}, \bar{p}] = \mathbf{p}$). In this talk an efficient method for solution of equations with uncertain parameters (interval, random, and fuzzy parameters) will be presented. The method allows adaptive error estimation.

Many numerical results, visualizations as well as mathematical theorems which are related to this presentation were developed automatically by the *SelfNet* system. The system is capable to perform many typical scientific tasks (e.g. prove theorems, prepare visualizations, get numerical/symbolic solution) automatically. *SelfNet* is capable to develop selected scientific ideas automatically and improve it itself. The system engenders not only the final results of the calculations, but also shows all intermediate steps which lead to its solution. New knowledge generated by the system is saved and can be used automatically in the future problems calculations. Once the new idea is added to the system it will never be forgotten and the system is capable to apply it for processing of future problems. *SelfNet* was developed by the author of this presentation.