Several Benchmarks for Heat Transfer Problems in COMSOL Multiphysics®

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Abstract

Nowadays all branches in modern science and industry tend to solve ever complicating problems. These problems may process large data or solve combined equations. As the result the time of calculations increases considerably. Therefore for many scientists it is very important to find ways of reducing the processing time and using available resources more efficiently. One of such ways is to parallelize the problem. In this work the author shows how several physical problems can be parallelized in the most efficient way.

For solving all problems COMSOL Multiphysics® software has been used. For the benchmarking the author used several workstations of different configuration (Xeon and Core i7 by Intel) and a cluster. A different number of cores were used as well as different size of RAM. In the work the author presents graphs which show how the processing time depends on the size of the correspondent problem on different machines.

The result shows that for some problems the best performance is achieved on Intel's Core i7 workstations. The larger the problem is the more efficient the workstations become.