Development of leading-edge CAE for automobiles with the K computer

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Objectives

In the competitive global market, further enhancing the safety, fuel economy and other performances of automobiles while reducing their production cost are imperative. The objective of this research is to develop an advanced simulation technology and apply this technology to automobile development, thereby ensuring a sustainable competitive edge in the global market. Instead of using an automobile manufacturer’s supercomputer, which takes 5 to 10 years to develop, we will use the “K” supercomputer to shorten the development time. We will also port commercial software to this supercomputer to help promote its use in industry.

Outline of Results

We study the following three high-priority themes.

Theme 1: The injury analysis of the motorcycle crew at the time of the vehicle collision → Reproduction of the accident phenomenon that we can carry out only in large-scale calculation environment

Theme 2: Speedup and Accuracy-improvement of the electromagnetic field simulation for high efficiency vehicle motor  
→ Speedup of JMAG solver and development of the simulation technology that cannot achieved without large-scale calculation environment

Theme 3: Prediction of the aerodynamic noise in the cabin  
→ Development of the analysis technology that we can carry out only in large-scale calculation environment

Theme 1 and 2, we developed high-accuracy simulation technologies useful for reproducing the phenomenon and for developing automobiles. We also identified specific problems to be solved before the analysis technology is put to practical use.

Theme 3, we developed the weak coupled analysis method of fluid, vibration and noise.