A HOLISTIC APPROACH TO POST-PROCESSING OF FEA RESULTS – CURRENT TRENDS

Dipl.Eng. Vassilios PAVLIDIS*, Dr.Eng. Dimitrios SISKOS
BETA CAE Systems S.A., Greece

BETA CAE Systems S.A., Greece
Kato Scholari, Thessaloniki
GR-57500 Epanomi
Greece

Tel: +30-2392-021420
Email: ansa@beta-cae.gr

ABSTRACT

The ever increasing use of finite element analysis during the development phase of a product, stemming from the continuous evolution and improved reliability of finite element codes, inevitably brings about a subsequent change to the post-processing of FE results by imposing diverse and hard tasks far beyond the simple visualisation of solvers output. The growing size of models results consequently in larger amount of data that need to be handled and post-processed efficiently. Furthermore, there is also the need to perform calculations using these data, whenever this is possible, either for calculating new variables that would provide better insight of the model or for conducting “what-if” studies in a simple & fast way avoiding consuming expensive solver time. Repetitive tedious and error-prone actions should be possible to automate so as to save time and avoid errors. The use of optimisation becomes a standard practice thus, imposing the demand for the easy coupling of the post-processor with the optimiser. Communication of results is unquestionable, therefore, the means for effortless reporting should be provided. Last but not least, verification of calculations and model validation are certain challenges, present throughout the whole post-processing and must be satisfied from within the post-processor.

This work presents an overview of how the aforementioned requirements, often being controversial to each other, can be addressed by μETA Post-Processor. Real life performance benchmarks with top-size models are being showcased. Advanced techniques for the conductance of comparison studies are described. Tools contributing to the model validation are available and relevant case-studies are presented. Simulation results are further exploited through the calculation of derived results, such as Modal responses and Section Forces, thus saving time by avoiding re-running the solver again.
A simple procedure for the readily coupling of μETA with any optimiser has been developed thus, minimising the user's effort to incorporate post-processing actions within an optimisation loop. This procedure has been successfully used also in a case of Multidisciplinary Optimisation scenario. Extensive automation capabilities, such as session files, scripting and user toolbars, have been combined together with advanced reporting capabilities in order to automate very complicated processes such as the final & error-proof reporting of a pedestrian test, thus resulting in significant time savings.