

Shorter Time to Market with Realistic Simulation

Implicit Case

LS-DYNA is a highly advanced general purpose nonlinear Finite Element software capable of simulating complex multi physics problems.

LS-DYNA is successfully developed focusing on the One Code Strategy, which allows the user to use the same FE software regardless of the nature of the simulation.

Following this strategy, the implicit capabilities of LS-DYNA has been developed in close corporation with the explicit code allowing for access to more than 100 material models and an extensive element library.

LS-DYNA implicit features both linear and non-linear simulations using the most efficient numerical solver techniques and is fully comparable to any other implicit FE code when it comes to functionality and robustness. From a performance point of view, LS-DYNA is the benchmark today due to its efficient MPP (Massive Parallel Processing) approach allowing for outstanding scalability.

Case study

The case beside shows the capabilities of the implicit solver in LS-DYNA. It is a complex problem to solve including very large deformations and high local contact pressures. The figures beside shows the simulation results in a symmetry plane which makes the challenges more obvious.

Three sealing rings made of rubber material are located in a steel structure. The simulation starts by closing the steel housing in order to properly locate the rubber sealing in the same way as in reality. The inner part located in the center is then translated, forcing the rubber parts to heavily deform and making the sealing water tight.

This case illustrates clearly the capabilities of the implicit solver in LS-DYNA. The code must handle high local contact forces between materials with very different stiffness (rubber vs. steel). In addition, the rubber parts becomes extremely deformed during the process, which requires state-of-art solution techniques in order to find convergence in the solution.

