

AKSELOS HYBRID SOLVER FOR ACCELERATED NONLINEAR ANALYSIS

Application Note

Akselos INTEGRA™

Hybrid Solver for Accelerated Nonlinear Analysis

OVERVIEW

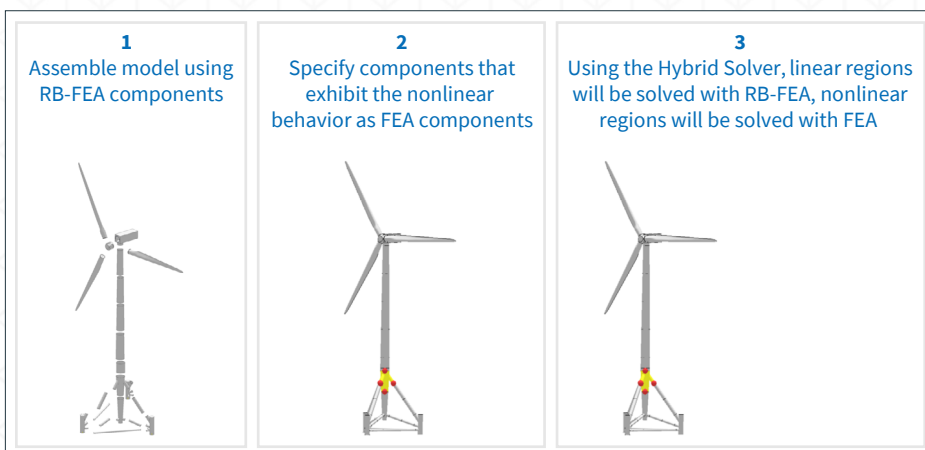
In addition to providing linear analysis capabilities, Akselos Integra™ enables fast analysis for the full range of nonlinear behavior related to materials, geometries and boundary conditions within large and complex structures.

MODELING APPROACH FOR NONLINEAR ANALYSIS

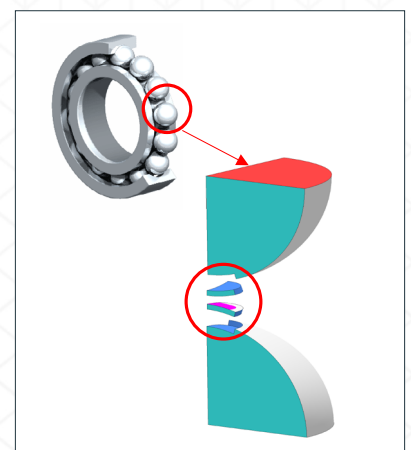
RB-FEA analysis applies to linear problems. In order to apply RB-FEA to nonlinear problems, Akselos provides the Hybrid Solver which uses FEA in nonlinear regions in conjunction with RB-FEA in linear regions. This provides a “best of both worlds” approach to nonlinear analysis: It gives the accuracy and flexibility of FEA for nonlinear analysis, while still bringing RB-FEA acceleration to regions of the model in which there is no nonlinear behavior. The Hybrid Solver is highly efficient for problems with localized nonlinear regions, e.g. analysis of a localized failure within a large structure.

BENEFITS

- Eliminate need for localized nonlinear analysis in which one must “guess” boundary conditions due to the unmodeled parts of the model.
- Accelerate the simulation time of nonlinear analysis by orders of magnitude without compromising accuracy.
- Drive design innovation by simulating real-world nonlinear behavior in a cost-effective way.



Modeling steps for plasticity analysis of a 5MW wind turbine using Hybrid Solver.



Plasticity and contact regions modeled in a ball bearing model using FEA Components. The rest of the regions are modeled as RB-FEA components in preparation for the Hybrid Solver

About Akselos

Akselos is a digital technology company headquartered in Switzerland, with operations in Europe, the USA and South East Asia. The company has created the world's most advanced engineering modelling, and fastest simulation technology, to protect the world's critical infrastructure today and tomorrow. The technology has the power to revolutionise how we build and manage our critical infrastructure, and pushes the boundaries of what modern engineering and data analytics can achieve. Developed by some of the world's best minds, the MIT-licensed technology builds something far beyond the capability of a conventional digital twin – a digital guardian that allows operators to not only monitor an asset's condition in real time, but helps them to see the future.



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