Efficient Modeling of Torsional Vibrations for Steady-state Simulation

All over the world, classification societies, shipbuilders, suppliers, and engineering partners such as Bureau Veritas, Caterpillar Marine Power Systems, Diesel United, Det Norske Veritas, Germanischer Lloyd, Mitsubishi Heavy Industries, Scana Volda, Stromag and VULKAN use SimulationX for designing and optimizing propulsion systems that are safe for people and the environment.

New technologies must meet the increasing demand on noise, weight and vibration reduction while operating in a reliable and sustainable way. If resonance vibrations cannot be avoided, they have to be calculated and kept within the framework of legal regulations. With the “Rotational Mechanics”, the “Powertrain Transmission”, and especially the “Torsional Vibration Analysis” package SimulationX offers efficient and comprehensive model libraries for the transient and steady-state simulation of propulsion systems.
The key to flexible sensitivity studies

An open architecture and a range of transparent, customizable models and libraries provide SimulationX users with the ultimate level of flexibility and user-friendliness – with special regard to requirements in the evaluation and certification of drive systems. The simulations can be done in time or frequency domain. A modeling adapted to frequency domain calculations ensures a numerical robust calculation even of complex models. The modeling of ice-impact can be done in time domain as well.

The model package “Torsional Vibration Analysis” of SimulationX is the key to sensitivity studies and efficient modeling for steady-state simulation of propulsion systems. The linear and non-linear model objects are tailored for simulations in the frequency domain and support the computation of stress, torque or loss power limits.

Results windows comparing real part and amplitude

Naval machines and structures
- Simulation of combustion engines, electrical machines, gears, shafts, couplings, dampers and typical loads
- Analysis and assessment of transient behavior, short circuits, driveline response to ice impact, structure vibrations, durability and comfort
- Evaluation of vibrations

Time and frequency domain calculations
- Quick and problem-oriented model set-up
- Numerically robust calculation even of complex models

Model package “Torsional Vibration Analysis”
- Optimized parameterization options and model setup
- Simulation of linear and non-linear systems
- Steady-state simulation in frequency domain

Open structure
- Easy modification and enhancement
- Elements can be combined with all models of the “Rotational Mechanics” and the “Power Transmission” packages
- User-friendly parameterization by values available from product data sheets, typical mechanical values or usage of predefined internal approaches