



VIRTUALDYNAMICS



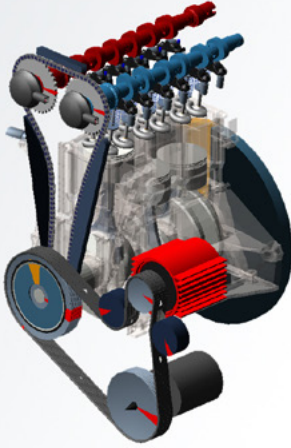
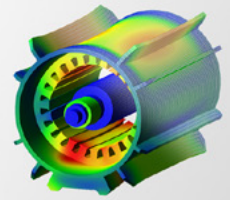
HYBRID AND ELECTRIC POWERTRAIN
DYNAMICS IN YOUR HANDS



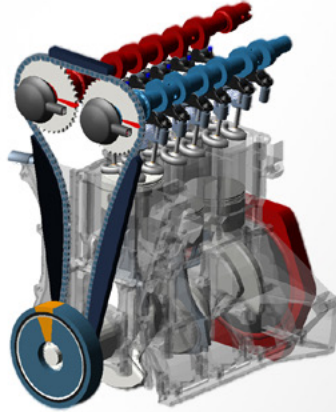
ELECTRIFIED POWERTRAIN SYSTEM SIMULATION



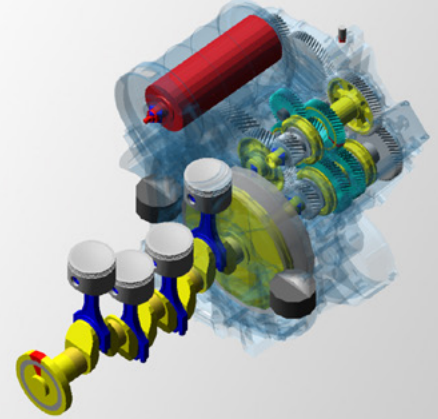
VIRTUALDYNAMICS



P0 topology



P1 topology



P2 topology

Electrified Powertrain Simulation with Virtual Dynamics

Virtual Dynamics provides a complete tool set to design and simulate electric motor-generators, internal combustion engines, transmissions and gearboxes. Advanced dynamic simulation of electro-mechanical powertrain systems in time domain with intuitive and easy workflows helps engineers to study system interactions of electric motor, engine and transmission. It allows simulation, design and development in component, subsystem and assembly levels.

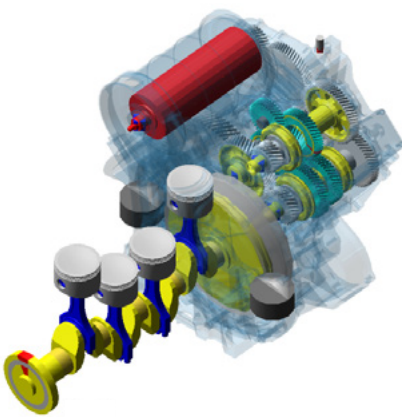
- Fully 3D models
- Template-based architecture
- Both shaft or hub drive options
- Parametric or flexible components for NVH or durability studies
- Imports electromagnetic forces from various commercially available software

Use Case: P2 Topology Powertrain Gear Whine

Virtual Dynamics was used to model a P2 hybrid topology powertrain in which eMotor-Generator is mounted to transmission. The model consists of fully-coupled internal combustion engine, dual mass flywheel, transmission and eMotor-Generator to simulate and assess the gear whine.

- IC Engine, transmission and eMotor-Generator
- Flexible transmission housing
- Flexible shafts
- 3D gears
- Dual mass flywheel
- Oil type and temperature
- Virtual accelerometer

There is a virtual accelerometer mounted on the flexible transmission casing to predict the accelerations. At the same location the acceleration was also measured on the Test bench and results are compared. A good correlation is seen as the accelerations are matching both in amplitude and frequencies.



Virtual Dynamics™ P2 Topology Powertrain Model

