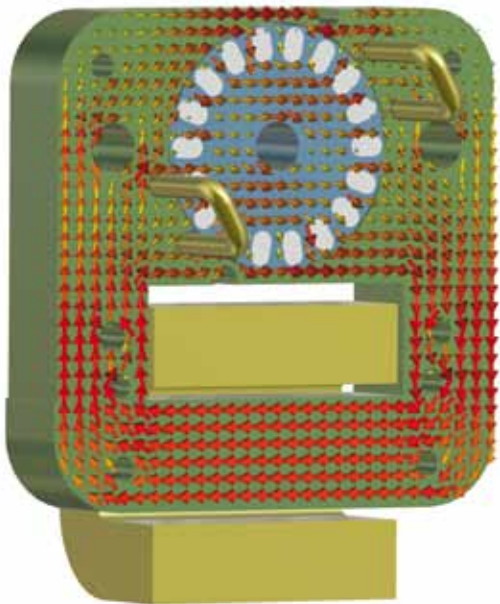


CST EM STUDIO LOW FREQUENCY ELECTROMAGNETIC DESIGN AND SIMULATION



Magnetic flux density under no-load conditions for a shaded pole induction motor

CST's tools enable you to characterize, design and optimize electromagnetic devices before creating your first prototype. This can help save substantial costs especially for new or cutting edge products, and also reduce design risk and improve overall performance and profitability.

CST EM STUDIO® (CST EMS) is ideal for the analysis of static and low frequency devices. It enables full 3D EM simulation in a wide application range including magnet and coil design. Modules include statics, quasi-static, full-wave, transient, and thermal solvers, all united in one user-friendly interface. This gives you the flexibility to choose the technology best suited to your application. Advanced design-flow integration with mechanical tools, versatile post-processing capabilities and inbuilt automatic optimization schemes, make CST EMS an invaluable part of your toolbox.

APPLICATIONS

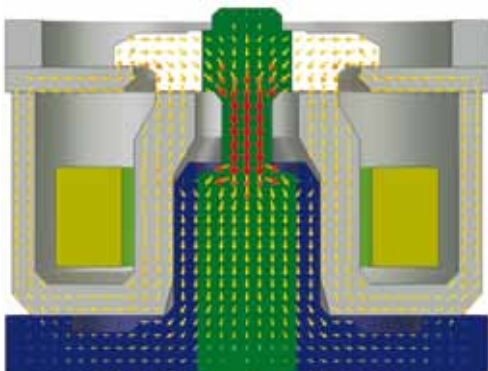
- Coil and magnet design
- Sensors and actuators, NDT
- Electromechanical devices
- Motors, generators and transformers
- Shielding
- Electrostatic and high voltage devices
- Biomedical applications
- Magnetic recording
- Induction heating



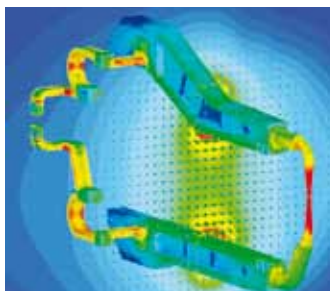
50 Hz gas-insulated switch

SOLVER MODULES

- **Statics:** electrostatic, magnetostatic and DC current
- **Low frequency:** electroquasistatic, magnetoquasistatic, full wave
- **Transient:** magnetoquasistatic transient
- **Thermal:** static and transient thermal



Magnetic flux density in a magnetic valve

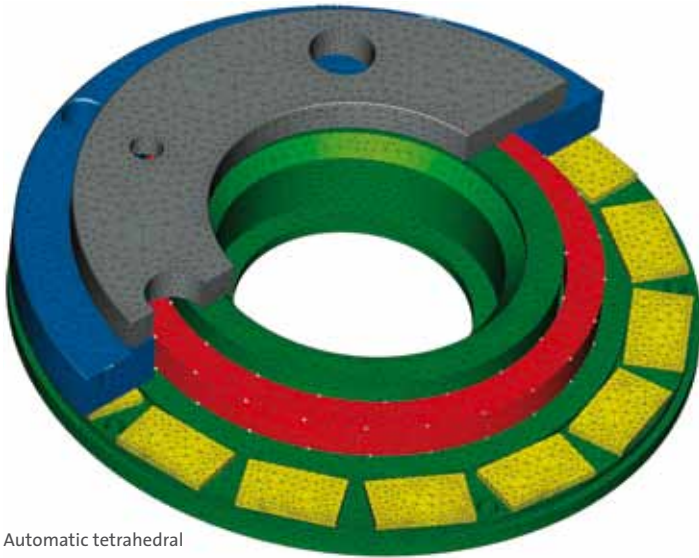


Current and magnetic flux density in a resistance spot welding gun at 50 Hz



CHANGING THE STANDARDS

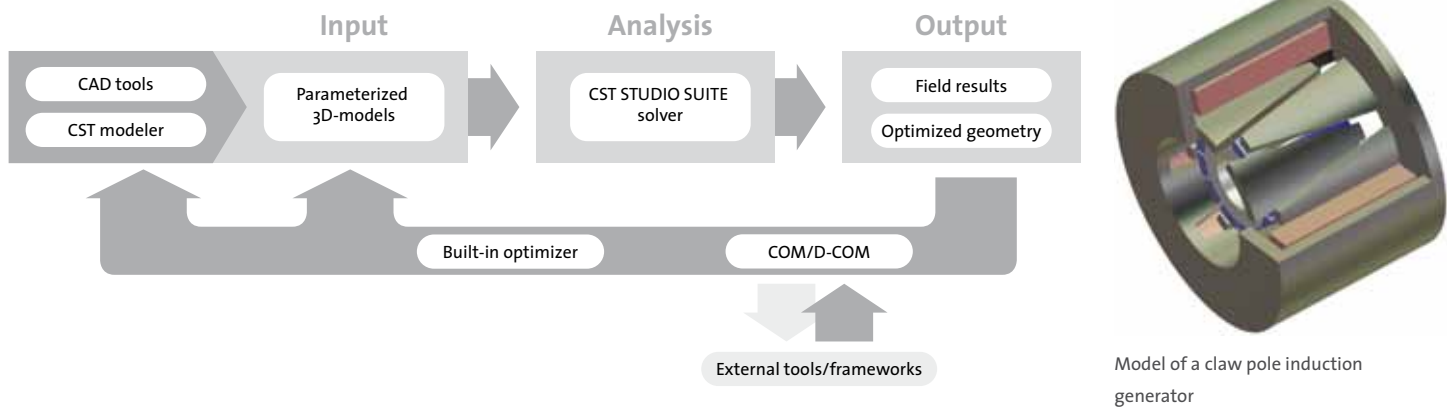
STATIC AND LOW FREQUENCY ELECTROMAGNETIC DESIGN AND SIMULATION



Automatic tetrahedral mesh generation in a magnetic brake

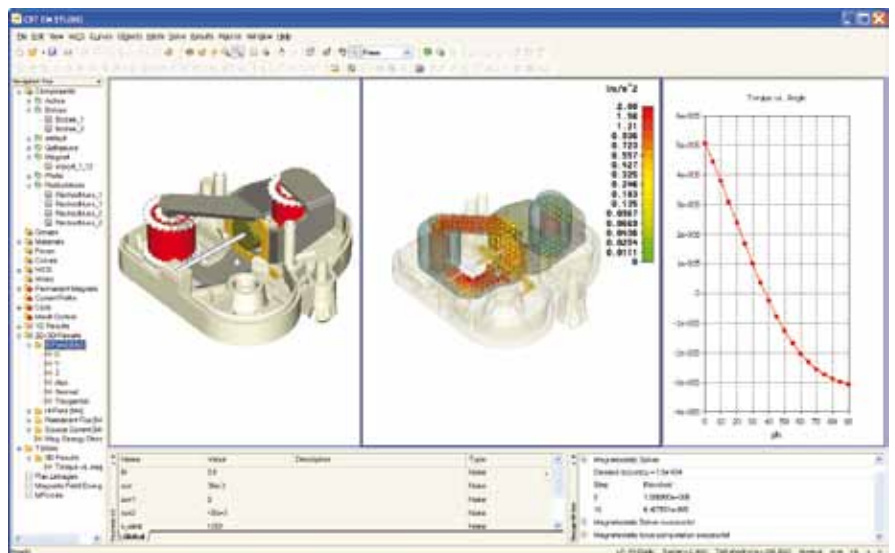
CST consistently promotes the best-in-class approach. We specialize in developing 3D EM software and provide straight-forward, easy-to-use links with other best-in-class vendors, connecting all available expertise. A wide range of import/export filters enable the easy exchange of geometrical data with CAD tools. Furthermore, imported structures can be modified and parameterized, and used for optimization and design studies. Moreover the powerful VBA based and OLE-compatible macro language allows direct communication with programs like such as MATLAB®.

SIMULATION WORKFLOW IN THE CST DESIGN ENVIRONMENT



KEY FEATURES

- Powerful, intuitive and easy-to-use user-interface
- CAD import, automatic healing, structure modification, and export
- Automatic adaptive mesh refinement
- Automatic post-processing template system for extraction of secondary electromagnetic quantities
- Fully integrated optimisation and parameterisation modules
- Force and torque calculation
- Inductance and capacitance calculation
- Flux linkage and induced coil voltages
- Potential and charge definition, voltage sources, coils and current paths, permanent magnets, non-linear materials, current ports and heat sources
- Standalone and co-simulation thermal capabilities between CST EMS modules and with CST MICROWAVE STUDIO® (CST MWS)
- Magnetostatic co-simulation between CST EMS and CST MWS for ferrite simulations
- Dosimetry simulation



CST EMS graphical user interface showing the workflow for the magnetostatic simulation of a stepper motor with torque versus permanent magnet angle parameterisation results.