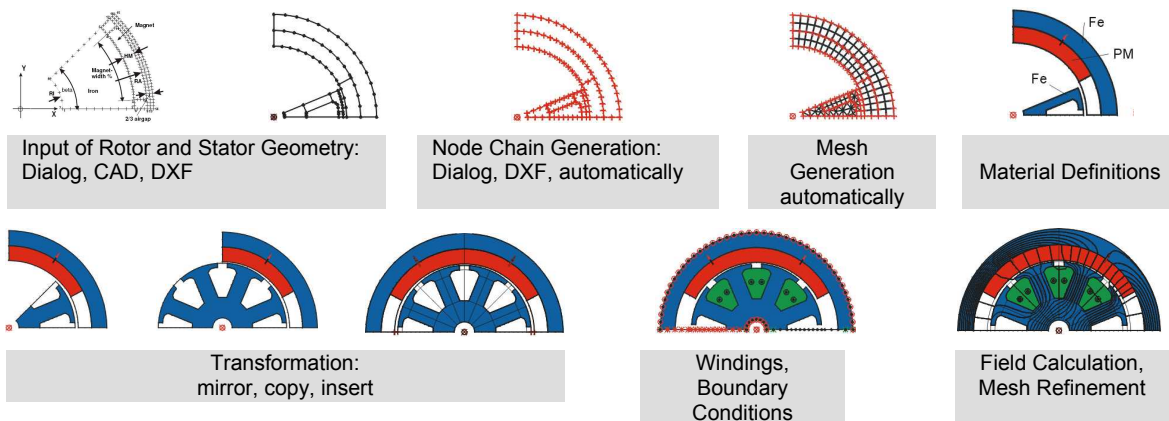**FEMAG** is an interactive software package for calculation of 2-dimensional static or temporally changing electromagnetic fields based on the methods of finite elements. FEMAG is developed since 1983 continuously under the leadership of Prof. Dr.-Ing. Konrad Reichert (Institute for Electrical Engines of ETH-Zurich/CH) by means of actual and praxis oriented tasks. In the meantime is FEMAG used by a lot of clients worldwide for analysis and optimal dimensioning of electromagnetic products particularly for evaluation of operating behaviour and electro magnetic stress of electrical engines.

FEMAG - DC and **- AC** contain
• An interface to external CAD systems (IGES, DXF)
• An own CAD system for creation and illustration of the geometry as base for generating node chains and mesh
• Input masks for FE model creation of electrical engines with windings
• Algorithms for creation and evaluation of windings
• A calculation part for 2-dimensional static or sinusoidal magnetic fields
• Miscellaneous functions for determination of the operating behaviour of electrical machines, for modelling (Ld/Lq) and for simulation of the processes of magnetisation and demagnetisation
• Functions for calculation of forces, torques, losses of iron, copper and eddy currents and analysis of field relations (i.e. stress caused by demagnetisation)

FE-Calculations with FEMAG (example: electrical machine with permanent magnet exitation

| Input of Rotor and Stator Geometry: Dialog, CAD, DXF | Node Chain Generation: Dialog, DXF, automatically | Mesh Generation automatically | Material Definitions |

| Transformation: mirror, copy, insert | Windings, Boundary Conditions | Field Calculation, Mesh Refinement |

Additional to simple field calculations are also multiple calculations possible. Thereby field calculations can be automatically operated for arbitrary currents in the windings and for different positions of the rotor. For every position magnetic field, torque, forces, winding fluxes and voltages are calculated. Out of that engine models are deducted und characteristic curves determined for linear or rotating machines with excitation by permanent magnets or current and for induction machines.

FEMAG-Analysis
Special importance is attended to the exact determination of forces, torques, fluxes of windings, voltages of windings and inductances.

Local mesh refinement assures exact calculations.

Result analysis: Fields, fluxes, forces, ...
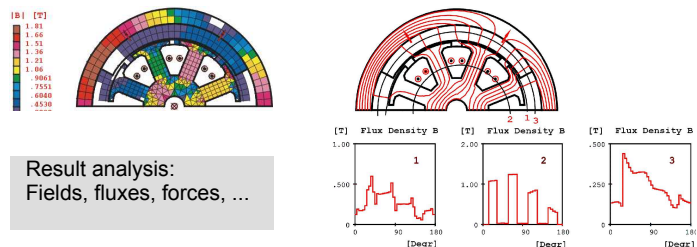
Dimensions as induction, magnetic field strength or eddy current allocation can be illustrated 2- and 3-dimensional.

FEMAG is deliverable for Windows™ and Linux operating systems. For realisation of own machine models, program functions and analysis is FEMAG available as source version with an own development environment. With this it also can be bound into client specific application development system.

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