A wide field of use

Featuring a large number of functionalities, including extended multiparametric analysis, advanced electrical circuit coupling and kinematic coupling, *Flux* is suitable for:

- Magnetic, electric and thermal fields
- Static, harmonic and transient analysis
- Parameterized analysis
- Magnetic / dielectric / thermal coupling
- External circuit connections
- Mechanical coupling
- Multiphysics coupling

Numerous applications

*Flux* is the right tool for the analysis, design and optimization for the following applications:

- Rotating machines
- Linear actuators
- Transformers & inductances
- Induction heating devices
- Sensors
- High voltage devices
- Cables
- Electromagnetic compatibility
- Non destructive testing
- And many other ones

Reduce design cost.
Reduce time to market

In a global context of design process optimization and time-to-market reduction, Flux brings an innovative solution capitalising on 30 years of electromagnetic simulation in an open and user-friendly interface. Flux is a finite element software application used for electromagnetic and thermal simulations, both in 2D and 3D. Suitable for design and optimization, teaching and R&D, our software solutions provide the most accurate analysis of your devices and systems.
CAE Software for the analysis of electromagnetic devices

1. **High performance geometric description**
   - An easy sketcher of 2D geometry including parametric capabilities
   - Embedded 3D fully parameterized modeling constructs
   - Advanced CAD import & export capabilities
   - A dedicated environment for electric rotating machines design

2. **Advanced physical properties** for high performance calculations
   - A full range of physical models to simulate the low frequency behaviour of electromagnetic devices.
   - Magnetic:
     - Static, steady state AC magnetic, transient
     - Circuit and mechanical couplings
   - Electric:
     - Electrostatic, conduction
   - Thermic:
     - Steady state AC thermal, transient
   - Thermal couplings:
     - Electrothermal, magnetothermal

3. **Advanced modeling techniques** for accurate and fast results:
   - Non meshed coils
   - Thin regions represented by surface models (no need to mesh the thickness)
   - Skewed geometries

4. **Solving process**: A fast and robust solver
   - Fully parametric solver allowing geometrical or physical parameter sweeps
   - Multiple linear and non-linear solvers and possibility to plug user-defined linear solvers
   - Embedded electromechanical solving for both 2D and 3D:
     - Strong coupling with circuit equations
     - Rigid body motion equations solved at each time-step
     - Automatic remeshing around the moving parts

5. **Results post-processing**: Show your results and convince
   - A fully multiparametric postprocessor enabling one to analyze the results from multiparametric solving
   - An extensive range of results
   - Flux gives access to various quantities such as:
     - Potential, flux density, temperature, electric and magnetic fields
     - Iron losses (Bertotti, LS Model), Joule losses in conductors
     - Electrical quantities on the components: current, voltage, power, inducance
     - Mechanical quantities: position, velocity, force, torque, speed
     - Skin effect visualisation
     - User defined quantities

**GOT-It optimization**
Search the design space in an efficient way
Boost your Flux capabilities using GOT-It. CEDRAT's powerful and reliable optimizer, even without being an expert in optimization methods. Well adapted to drive FEM models, GOT-It goes beyond simple parametric studies, allowing to obtain significant gains in your designs.

**Multiphysics interoperability**
CEDRAT has developed an API which enables Flux to communicate with any kind of software.
It can be coupled to other simulation software to model the interaction with CFD, system simulators, mechanical... This connection can be direct or driven by the MpCCI technology.
Guiding your Technical Innovation

Flux key applications

Documentation

Over 3500 pages are available in 30 manuals and a variety of tutorials for key applications. A full HTML on-line help will support you in your daily job to go straight to the necessary information. Technical papers are also available to assist you to explore creative ideas for innovation.

References

ABB, Alstom, Auxilce, BMW, Bombardier, Borg Warner, Bosch, CEA, CNES, European Space Agency, Faulhaber Motoren, Gauss Magneti, Globe Motors, Goodrich, Grundfos, Hager Electric, Isliker Magnete, ISL, ITT FLYGT, Kollmorgen, Legrand, Leroy Somer, LG electronics, Lokheeb Martin, Magneti Marelli, PSA, Renault, Robert Bosch, Schneider Electric, SEW Eurodrive, Siemens Automotive, Snecma, Sulzer, Thales, TRW, Valeo, Visteon, Walker Magnetics, Wolf, Zodiac as well as many university labs and teaching institutes...

Not just tools!

Long term tools in both software development and consulting work make CEDRAT and its distribution network a valuable partner to support and train you when using our softwares. Training and support competencies:

- Use of the programs
- Numerical methods
- Adapted methodology
- Application / Device specific
- Limits of the models' validity
- Customer's models resolution

Consulting services


A team of experienced design engineers is available to create, design or optimize innovative solutions. If you are interested in contracting our consulting services, please contact us or visit our website.

Quality assurance

Flux is controlled and developed under Quality Assurance procedures. It ensures a constant validation of the capabilities and the results of the software.