FORGE®

Developing Your Own User Routines

How to introduce your own rheological models, friction laws, damage criteria? This is the purpose of user routines.

FORGE® software offers the possibility to access to a certain number of Fortran routines that the user can modify as desired. This functionality allows engineers to enhance their models thanks to the implementation of new models and user variables. The second day will be devoted to coding your own user routines. You will also generate your user solver.

LEVEL

Advanced - Users willing to integrate their own Fortran routines in FORGE® solvers.

PREREQUISITES

Substantial experience with FORGE® is required as well as basic programming skills.

GOALS

- **Understanding of the various user routine categories**
- **Compiling and creating dynamic libraries**
- **Implementing rheological law, friction law, damage criteria models**
- **Calculation of additional variables that are not mentioned among the results calculated by the standard solver**

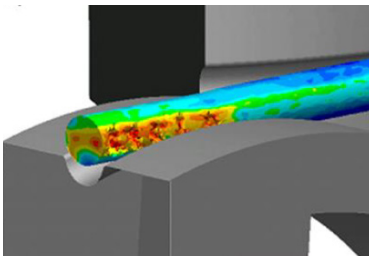
OTHER RECOMMENDED COURSES

- FORGE® - Automatic optimization
- FORGE® - New functionalities of FORGE® NxT 4.1

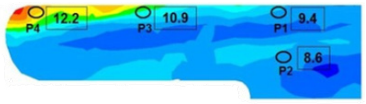
TRAINING	DURATION	PRICE EXCL. TAX	PARTICIPANTS
In-company	2 days	€3200 per training	1 to 3 people

DAY 1 > 8.30 a.m. to 12.00 p.m. & 1.30 p.m. to 5.00 p.m.

Introduction	▪ Presentation of Transvalor ▪ Course goals
General	▪ Concept & origins ▪ DLL dynamic library concept ▪ MS Visual Studio compilers ▪ Directory structure ▪ Saving a user solver
User routines	▪ General concepts: - State variables - Dynamic variables - Reserved names ▪ Differents law types: - LOIF laws: calculation of user variables in free surface or in contact with tools - LOIV laws: calculation of user variables in object-specific volume - Subtypes: Util, Evol, Meca, Intg, Rheo, Sig0 et Gsiz ▪ Application with coding exercises in Fortran 90 - Wear model computation on dies (LoiF_Util) - Implementation of custom damage criteria (LoiV_Util) - Calculation of stress tensor in cylindrical coordinate system (LoiV_Meca) - Calculation of strain tensor (LoiV_Intg) - Calculation of mean cooling rate (Loiv_Intg) - Implementation of model for friction evolution (Loif_Evol) - Implementation of model for heat transfer evolution (Loif_Evol) - Programming of model for material behavior (Zener-Hollomon, Johnson-Cook…) ▪ Concrete cases exploitation - Data setup and practical case launch - Results analysis ▪ Going further - User functions - Special preprogrammed functions



Damage criterion Lemaitre
Courtesy of UGITECH



Grain size distribution with Tecnalia's consent

DAY 2 > 8.30 a.m. to 12.00 p.m. & 1.30 p.m. to 5.00 p.m.

Client user routine	▪ Application ▪ Coding and adding user routine ▪ Compiling and creating solver ▪ Launching calculation and viewing results
Conclusions	▪ Questions and course assessment