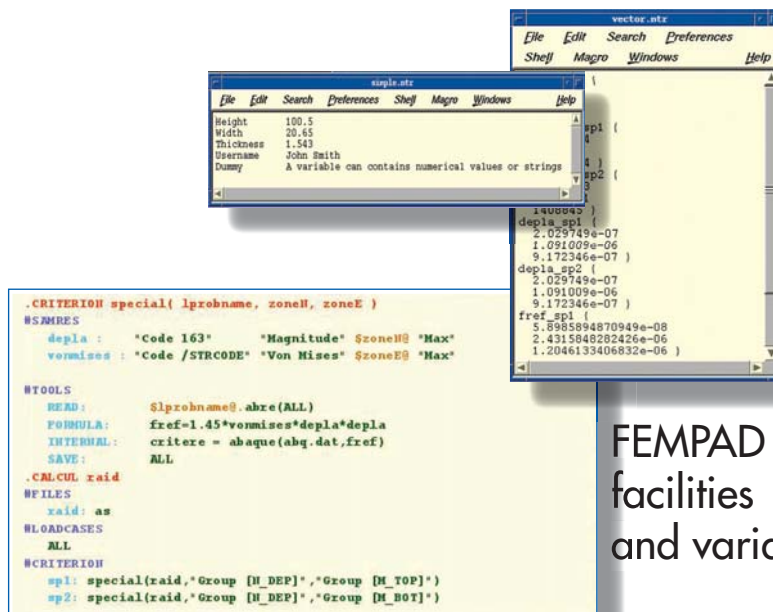


FEMPAD



FEMPAD offers numerous facilities for tool management and variable management.

FEMPAD completes FEA/CAE products with post-processing features. This software, developed by SAMTECH, helps analysts, engineers and designers in saving time while communicating data and managing easily their projects.

The FEMPAD software has been design according to a classical 3-tiers scheme, which offers the advantage of decoupling the know-how of the user and the technological features from all the informatical aspects:

- All informatical aspects are taken in charge by the software (level 1, by Samtech)
- The computational and technological features are encoded into the data sets, which remain the property of the customer.
- The final users have just to launch the computation. They do no longer worry about methodology, they are no longer bothered by writing piles of paper, and can definitely focus on the computation results and the mechanical design.

Level 3	APPLICATION USE: OPERATIONS
Level 2	APPLICATION DEVELOPMENT: METHODS DPT
Level 1	SOFTWARE DEVELOPMENT: SAMTECH

FEMPAD makes it possible to create calculation sequences of any type. FEMPAD works with two specific kernel gears:

- the Tool Manager : used to organize the calculation to be launched;
- the Variable Manager: which simplifies the communication between all the tools.

Variables

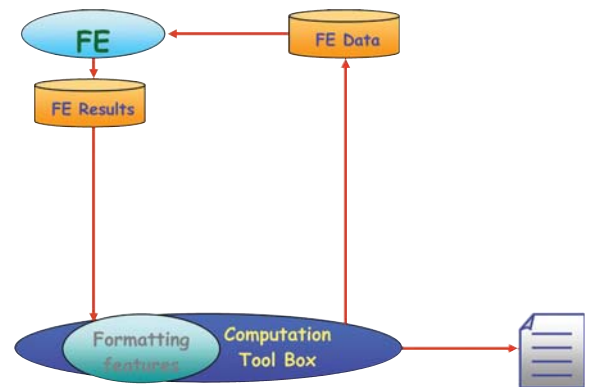
FEMPAD variables, which rely on the same library as the FEMWORD ones, can be indifferently numeric or alphanumeric. Their dimension can be scalar, vectorial or matrix. They define the inputs and the outputs of the various tools used in the data set. The starting variables can be obtained by reading neutral files, but SAMCEF users can also benefit from the possibility to initialize variables from requests of SAMRES type.

Tools

Users have full access to numerous internal tools but they can also define and use their own external tools. The latter are launched through shell scripts and all communications can be done via neutral files. FEMWORD is advantageously used at this level to create data files on basis of these neutral files.

Among the internal tools, following features are available:

- use of tables (one, two or three entry variables);
- all arithmetic and mathematical operations;
- processing of character strings;
- programming tools (tests, loops, etc);
- etc.

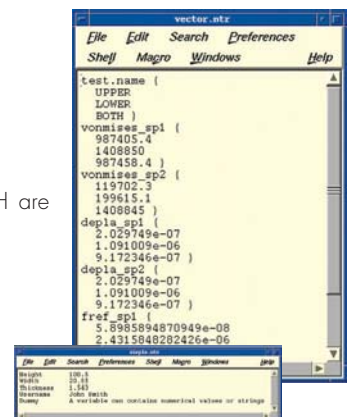


PROGRAMMING AN APPLICATION

FEMPAD and FEMWORD, another complementing software developed by SAMTECH are closely linked together, even if these software can be used separately.

The implementation of an application in FEMPAD / FEMWORD follows this process :

- Write data files for FEMPAD: In these files, starting variables are initialized (from SAMRES requests or by reading a neutral starting file). During the calculation phase, internal or external tools are launched. The final output file is materialized in the neutral file, which can be used in FEMWORD.



- Scripts: Creation of connection scripts with external tools when internal tools are not sufficient. These scripts are made of 3 phases: data preparation starting from a neutral file (for example, by using FEMWORD; it is then also necessary to prepare the data file templates); calculation itself; writing of the output neutral file. Considering the simplicity of the neutral format, it is often easier to carry out this last point by slightly modifying the output of the external program that is called.
- Different report templates.

EXAMPLE OF DATA FILE

The data files of FEMPAD are organized as following:

1. The first level corresponds to the definition of criteria. The criterion is the basic calculation unit in which we find several sections: the main variable initialization (section # SAMRES and # SAMDAT) and the tool section (# TOOLS), which describes the operation sequence (with all programming possibilities exposed above). A criterion can be defined with a set of arguments, which allows the use in several different situations.

2. At the higher level, the concept of calculation definition is composed as following:

- # FILE: gathers all result files to use in the SAMRES executions
- # LOADCASES: allows a possible selection of the loading cases to be taken into account-
- # CRITERION: defines the criteria set to be carried out , completed by their arguments.

```
.CRITERION special( lprobnam, zoneH, zoneE )
#SAMRES
  depla : "Code 163" "Magnitude" $zoneH "Max"
  vomises : "Code /STRCODE" "Von Mises" $zoneE "Max"

#TOOLS
  READ: $lprobnam@.abre(ALL)
  FORMULA: fref=1.45*vomises*depla*depla
  INTERNAL: critere = abaque(abq.dat,fref)
  SAVE: ALL
.CALCUL raid
#FILES
  raid: as
#LOADCASES
  ALL
#CRITERION
  sp1: special(raid,"Group [H_DEP]","Group [M_TOP]")
  sp2: special(raid,"Group [H_DEP]","Group [M_BOT]")
```

DOCUMENTATION

For direct access to information, the Users Guide and Help manual are available via your favorite navigator (HTML).

COUPLING FEMPAD WITH EXTERNAL FEA/CAE SOFTWARE

FEMPAD can be easily linked with external software from SAMTECH product family but also with any other commercial software at the simple cost of writing an interface able to write neutral files. The file compatibility between SAMCEF modules makes it possible to perform a structural or mechanical calculation while automating design and analysis features with FEMPAD.

The following SAMCEF modules are compatible with FEMPAD. FEMWORD and FEMPAD are based on the same SAMCEF internal library of variable management.

- SAMCEF Asef, Dynam, Stabi: linear static, modal and buckling analyses,
- SAMCEF Mecano: unique integrated software that solves non-linear structures and mechanisms problems. The software is declined to provide a more specific answer to following analyses:
 - MECANO Structure: dedicated to the non-linear analysis of structures,
 - MECANO Motion: dedicated to the static, kinematical and dynamic analyses of flexible mechanisms,
 - MECANO Cable: dedicated for the analysis of cable systems subjected to electro-dynamic and aerodynamic efforts,
- SAMCEF Thermal: Stationary and transient non-linear themes analysis.

FEMPAD can also be used as an application in BOSS quattro.

PLATFORMS

FEMPAD is available on most UNIX platform and on Window NT, 2000 and XP Pro.

About SAMTECH

SAMTECH is the European leading provider of Integrated Computer Aided Engineering (CAE) Solutions. SAMTECH offers a complete range of scientific analysis and optimization software modules to companies willing to increase their competitiveness using virtual prototyping.

The „**generic software tools**“ of SAMTECH include the general linear and non-linear FE package SAMCEF, the explicit FE code EUROPLEXUS, the standalone CAD/CAE modeling environment SAMCEF Field, the transparent implementation of SAMCEF in CATIA V5 (TEA Mecano and TEA Thermal) and the optimization platform BOSS quattro.

The „**professional solutions**“ of SAMTECH are based on its generic software tools and are dedicated to specific domains of application like rotor dynamics, modeling of composite structures, mechatronic modeling of machine-tools, modeling of large deployable or inflatable structures, modeling of cable systems, modeling of high voltage substations, modeling of pipes for automotive industry,...

Finally, with the „**third party and customized solutions**“ activity, SAMTECH provides its customers with professional services for the development, the reengineering, the packaging and the deployment of proprietary professional software solutions.

Some References

Aerospace

EADS-LV, AIRBUS, EADS-CCR, EUROCOPTER, SNECMA, SNECMA-DMS, MESSIER DOWTY, MTU, HUREL DUBOIS, HISPANO, LATECOÈRE, CRYOSPACE, ALTAL, SABCA, SONACA, TECHSPACE AERO, ESA/ESTEC, ASC, BOEING HELICOPTER, DASA, IBERESPACIO, BOMBARDIER AEROSPACE, FIAT AVIO, ALENIA AERO, ALENIA SPAZIO ...

Transport

PSA, RENAULT, DAIMLER-CHRYSLER, PORSCHE, LOHR, VW, DELPHI AUTOMOTIVE SYSTEMS, RENAULT SPORT, TUC RAIL, ALSTOM, ADTRANZ,...

Energy

EDF, ABB, ENEL, SCHNEIDER, GE ENERGY PRODUCT, ALSTOM, SEHV, ...

Mechanics

PICANOL, MAK, SOLAC, SAINT GOBAIN PAM, GLAVERBEL, RENAULT AUTOMATION-COMAU, ...

Defence

MBDA, FNNH, GIAT INDUSTRIES, CAP, DCN, DGA, ...

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