Release Notes Digimat 6.0.1

May 2015
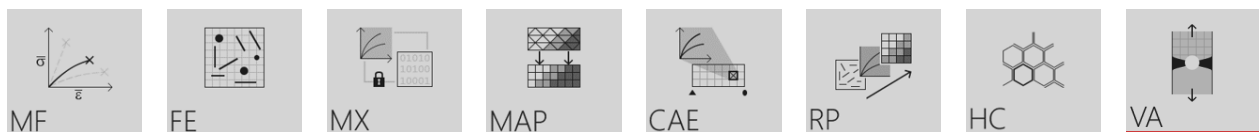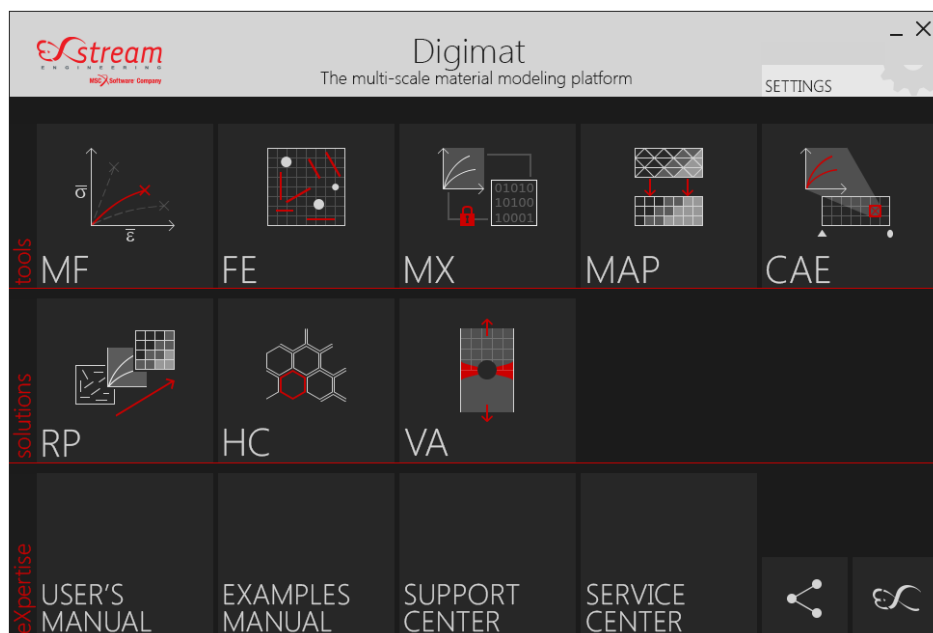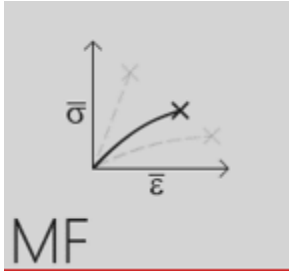
New Capabilities

- Failure indicators
  - Temperature dependent strengths in failure criteria
   - Similar capabilities to strain rate dependencies
    - Thermo-elastic and thermo-elastoplastic models
- Progressive failure
  - New multi-component 2D failure indicator
  - Independent damage law per sub-failure indicator
- Drucker-Prager
  - New formulation of isotropization for enhanced robustness
- Curing
  - Johnston-Hubert model for UD materials
  - Access to curing state allowing to define specific dependences of material parameters for thermo-elastic and thermo-viscoelastic models
  - No chemical shrinkage
  - Constant CTE definition above and below glass transition temperature
- Outputs
  - New option allowing to select the number of digits in the output files

Bug fix

- Fix Tsai-Hill 3D failure criterion with dependencies
  - Load models in Digimat-MF and re-assign dependencies to criterion parameters

FE
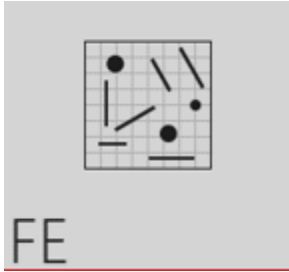
New Capabilities

- Discontinuous long fiber composites
    - Specific RVE generation algorithm allowing to generate DLF microstructures
- Automatic stiffness generation
    - New options allowing to automatically compute orthotropic engineering moduli (stiffness & conductivities)
- Curing
    - Available with FE solver
    - Johnston-Hubert model
    - Computation of chemical shrinkage
    - Constant CTE definition above and below glass transition temperature
    - Access to curing state allowing to define specific dependences of material parameters for thermo-elastic and thermo-viscoelastic models
- Additional material models
    - Thermo-viscoelastic in Marc and FE solver
    - Drucker-Prager in Abaqus
- CPU improvements when post-processing Marc and FE solver results files
- Interface to J-Octa
    - User definition of inclusions' positions and orientations
- Licensing
    - Mesh generation and visualization now accessible with DIGIMAT_FE_MODELER
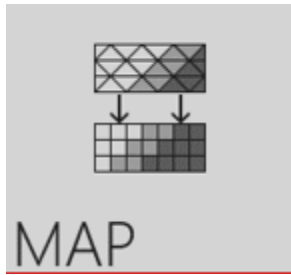
New Capabilities

- Reverse engineering of Tsai-Wu 3D transversely isotropic failure criterion
- Improved algorithm for reverse engineering
  - Local method
  - Global method
- New grades
  - Radici
    - RADILON A RV300W
    - RADILON A RV350W
    - RADILON S RV300W
  - Solvay Specialty Polymers
    - Veradel AG-330
    - Ryton R-4-200BL
    - Amodel AS-1145
    - Amodel A-6135
    - Amodel A-1133
    - Ixef 1622
    - Ixef 1521
    - Ixef 1022
    - Amodel AS-1933
    - Amodel FC-1150
    - Amodel FC-1140
    - Amodel AS-4145
    - Amodel AS-1945
  - Trinseo
    - PULSE 979
    - VELVEX 5250
    - PULSE 630GF

- ENLITE PP LGF 6002 + 67%PP
    - ENLITE PP LGF 6002 + 50%PP
    - ENLITE PP LGF 6002 + 33%PP
    - ENLITE ABS Alloy LGF 6001 + 42%ABS
  - SABIC
    - NORYL FE1630PW
    - STAMAX 20YK270E
    - STAMAX 30YK270E

MAP

New Capabilities

- New automatic mesh superposition algorithm with improved robustness (advanced method)

Bug fix

- Corrected export of initial stresses for Abaqus

New Capabilities

- Progressive failure
  - Multiple damage laws with a single failure indicator
  - Significant CPU time reduction for UD/shell/explicit simulation configurations
- Hybrid Solution
  - Minimization of the number of state variables
  - Support of unbalanced woven
  - Thermally dependent failure strengths in TE & TEP
  - Support of thermo-viscoelastic models
  - Hybrid parameter reader and viewer allowing to compare hybrid & micro responses
  - Failure
    - Strain based failure criterion allowing to differentiate tension and compression based on triaxiality
  - General CPU time reduction
    - Significant for shell elements
    - Minor for solid elements
- New outputs for UD materials
  - Fraction of failed/non-failed integration points through the thickness of shell elements
- Interfaces to FEA
  - MSC Nastran SOL400/SOL700
    - Support of version 2015   (Windows / Linux 64 bits)
  - Abaqus
    - Support of version 6.14   (Windows / Linux 64 bits)

- LS-Dyna
  - Support of version 6.1.2   (Linux 64 bits)
  - Support of version 7.1.1   (Windows / Linux 64 bits)
  - General robustness improvements
  - Correction of energy computation
- Ansys
 - ACT plugin for Ansys Workbench

New Capabilities

- Graphical engine
  - Improved CPU and memory performance
  - Visualization of orientation using vector/ellipsoidal plots
- Mapping
  - New mesh superposition algorithm with improved robustness
  - 1D mapping to define the desired number of layers in shell structural mesh
  - Improved flexibility for loading of orientation files
    - Each element must have at least one information defined
- Interfaces
  - Pam-Crash 2013
  - MSC Nastran SOL1XX
    - Weak coupling for 2-phases elastic models
  - Marc
    - Switch between Intel-MPI and MS-MPI in Settings Manager

Bug fixes

- Improved robustness of FEA results import in Ansys Workbench
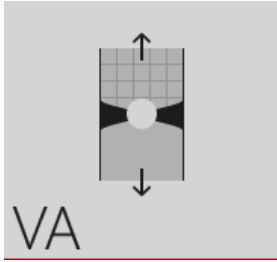
Main Capabilities

- Prediction of allowables
  - UD materials
  - Unnotched tension/compression and open-hole tension/compression tests
- Test matrix preparation
  - Definition of materials, layups, tests, environment conditions
  - Definition of sampling (number of batches, panels and specimens)
- Simulation preparation
  - Import of Digimat model including progressive failure
  - Calibration of Digimat model from datasheet
  - Definition of micro-level variability
    - Gaussian distributions
  - Definition of FEA settings
    - Mesh size, element type, meshing strategy, number of timesteps
  - Generation of FEA models
    - Preview mesh
    - Preview random draws
- Simulation run
  - Embedded solver for local run
  - Job management
    - Job prioritization
    - Monitoring
- Post-processing
  - Automatic extraction of stress-strain curve, stiffness and strength
  - Computation of A, B-basis and mean values for strength following CMH17 procedures
  - Strength and stiffness distribution plots

- Visualization of stress, strain and damage fields on coupon model
- Creation of a customized report
- Export of raw results to Excel
- Additional functionalities
  - Save Digimat-VA project
    - light or complete
  - Management of working database
    - materials, layups, tests, conditions and FEA settings

Additional info :

- Windows 32 bits is fully dropped. Windows installer is now only containing 64 bits binaries.
- Windows XP operating system is not supported anymore.
- Digimat third-party libraries for Digimat-CAE analyses under Linux have been moved from /Digimat/Digimat2CAE/6.0.1/lib to Digimat/Digimat/6.0.1/lib
    - Please make sure to update the path used in your queuing system. Check user's manual for more details.

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