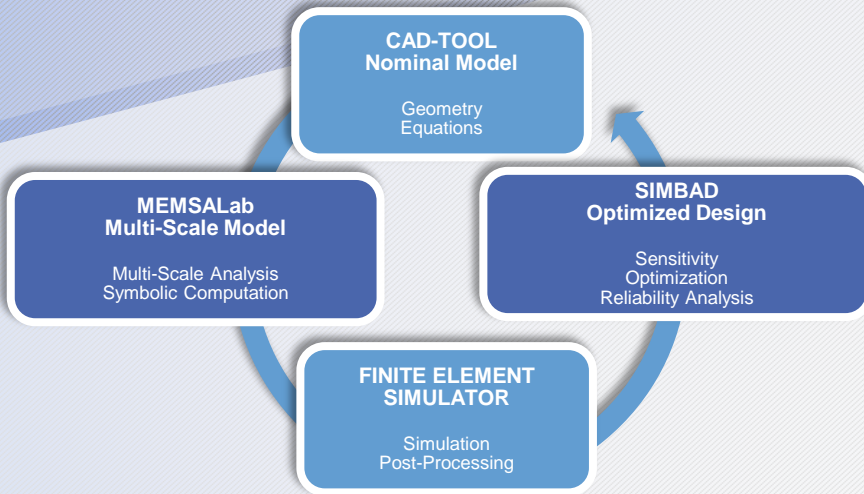


FEMTO-ST and LIFC are creating MEMSALab the first general tool to assist design arrays of MEMS and NEMS based on a multiscale approach. It will speed up design flow for a class of systems not covered by the existing softwares.

Combination of two technologies

Our multiscale multiphysics model generator is the result of both together, multiscale methods and advanced techniques of symbolic computation. Design of Arrays of MEMS or NEMS will be generated by a CAD tool and sent to MEMSALab. The resulting multiscale model will be automatically transferred to finite element software for simulation. MEMSALab will also be connected to the design environment SIMBAD.

Mems Arrays Design Flowchart



MEMS Arrays Modeling

MEMS and NEMS Array devices are multiscale by nature because of their repetitive structures. Multiscale methods are a first choice for their simulation. They can also handle other features such as thin substructures and strongly heterogeneous physical constants.

Fully parametrized models

A multi-scale model results from successive mathematical transformations of standard multi-physics equations. It keeps all parameters of the original model, but its simulation is far faster. It is well suited to be used for model-based optimization. In MEMSALab the mathematical transformations are executed automatically for each new design. This strategy is flexible and versatile.

Design Environment

SIMBAD SIMBAD, developed by the Applied Mechanics Department of the FEMTO-ST Institute, provides a generic simulation-based design tool for design sensitivity, mono-objective optimization, multi-objective optimization, reliability analysis under uncertainty, model validation and uncertainty quantification and info-gap robustness of design decisions to lack of knowledge.

