



MARCH 6, 2014

# Future@SystemX

## Crash model réduction

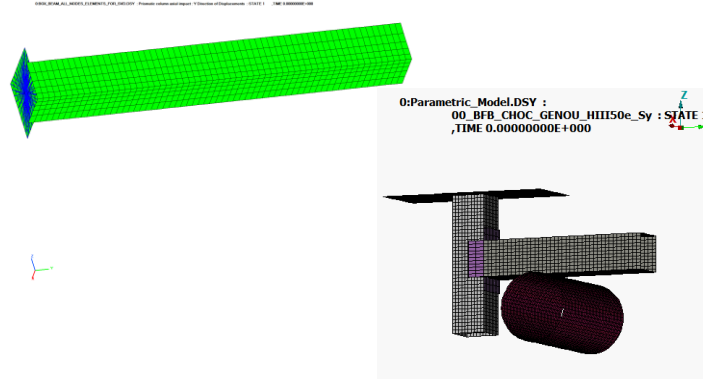
### Project : ROM

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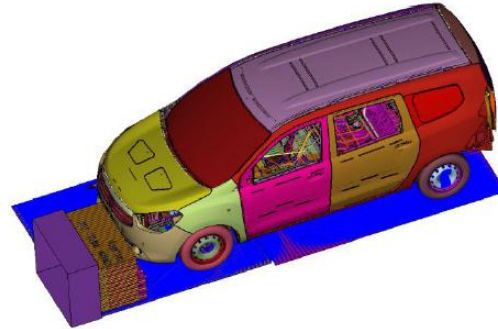


Reduce a simple part :



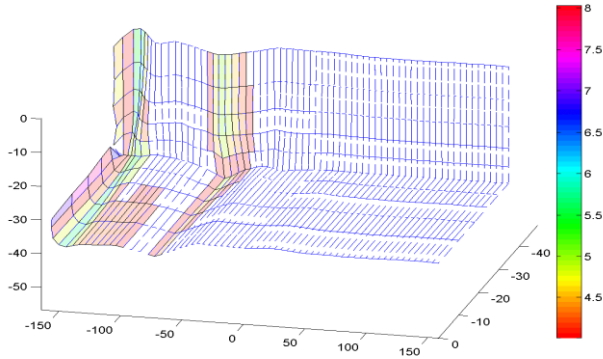
Reduce a sub-system :

Reduce a crash model  
for a complete vehicle  
(concatenation of sub-systems) :

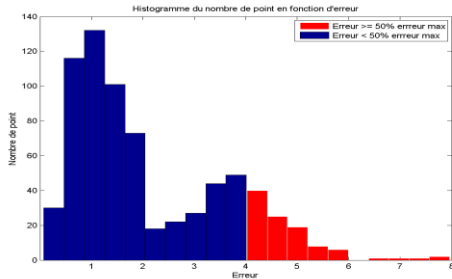
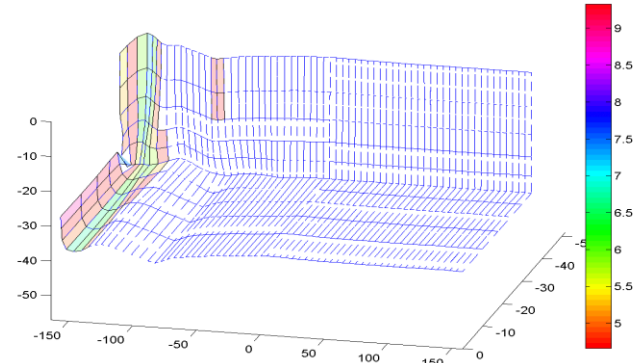


# Can we reduce the crash simulation of a simple part ?

## 3-axis SVD, viewed with quantile error

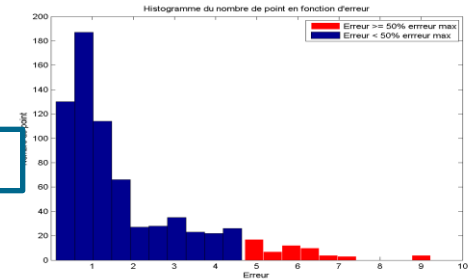


Colored element : element with error  $\geq 50\%$  maximum error



**Thickness = 0.8mm**

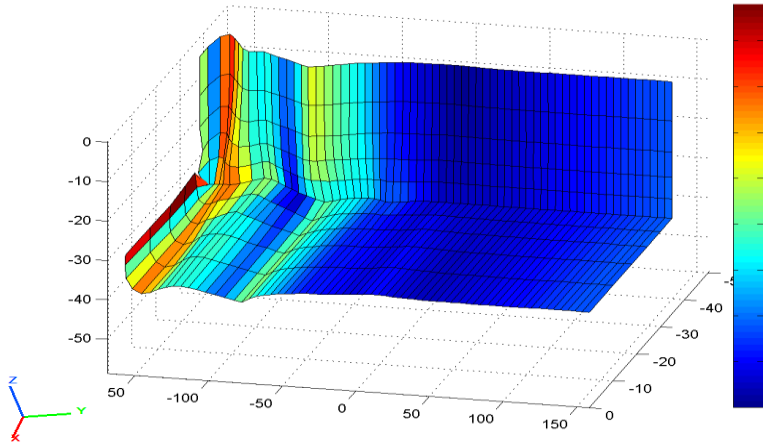
In red color : error  $\geq 50\%$  maximum error



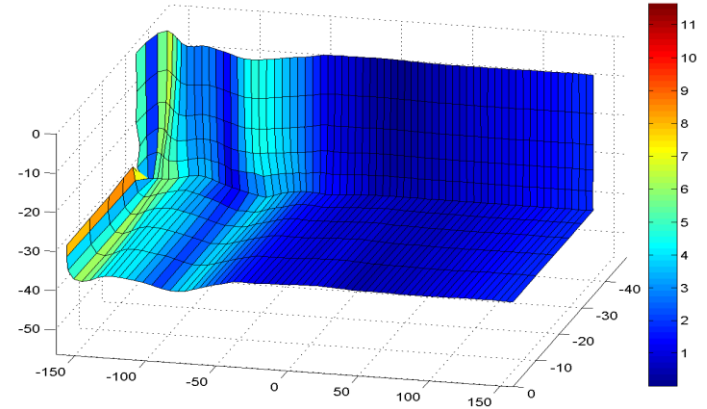
**Thickness = 1.6mm**

# Can we interpolate a crash simulation ? - 1

## 3-axis SVD vs. linear interpolation, axis to axis



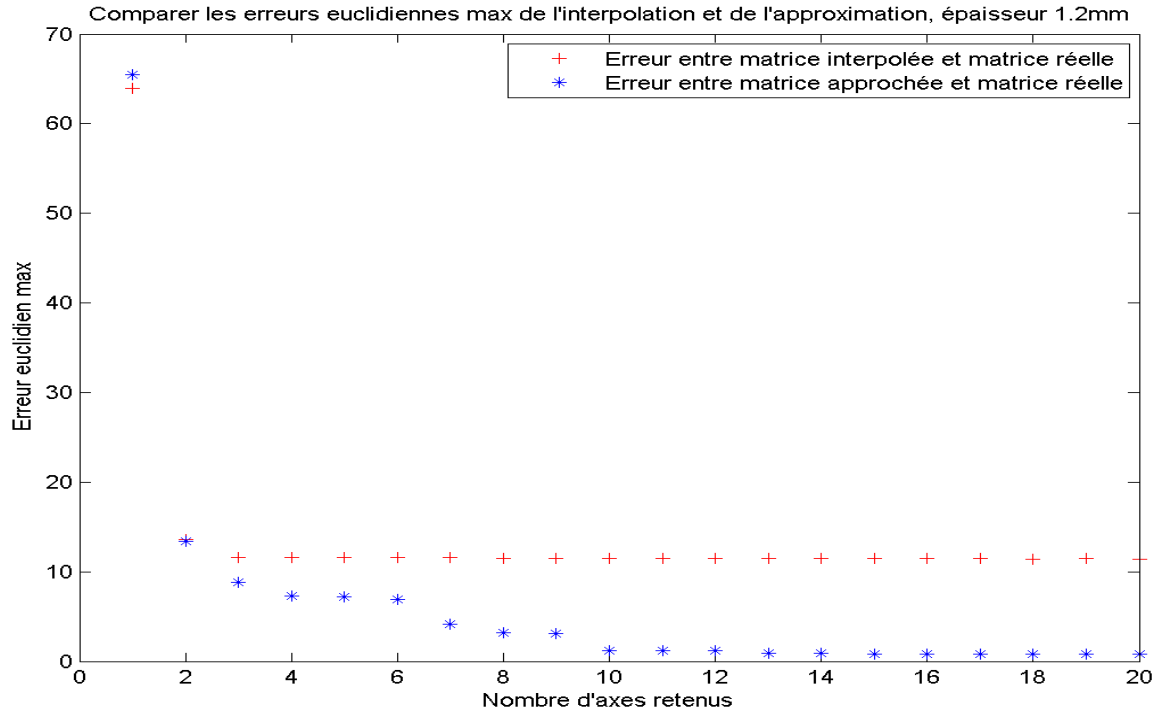
**3-axis SVD  
approximation of 1.2mm**



**Interpolation of 1.2mm  
from 0.8mm et 1.6mm**

# Can we interpolate a crash simulation ? -2

## Maximum error of interpolated matrix and approximate matrix



# Can we reduce the crash simulation of a subsystem?

## Real simulation vs. 3-axis SVD approximation

