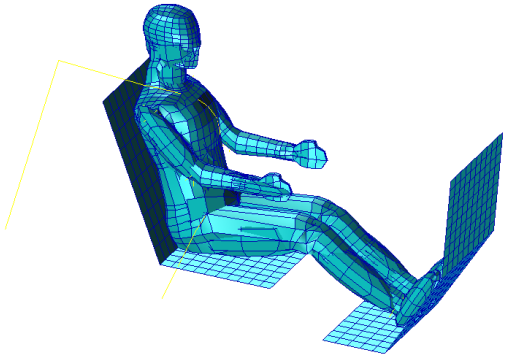
CASE STUDIES

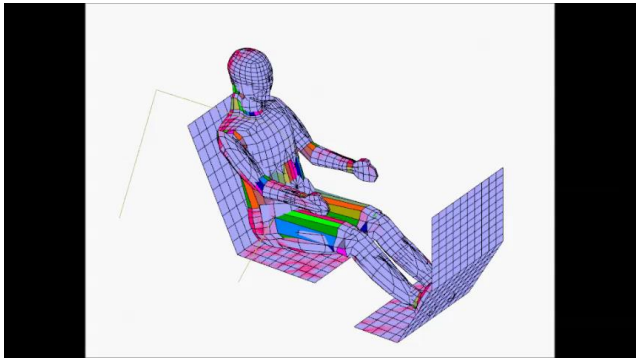
ODYSSEE Applications with MSC Software NASTRAN, MARC, DYTRAN, ADAMS, …

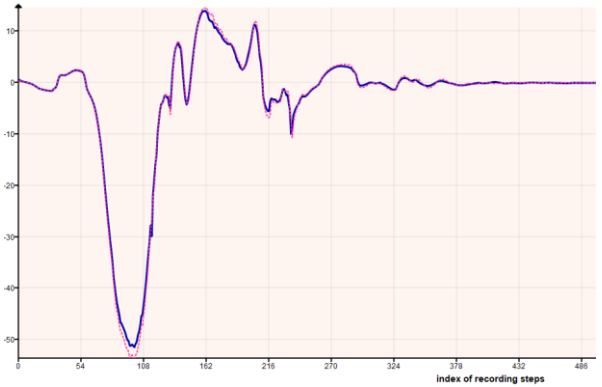
CADLM
TRANSFORMING DATA INTO INTELLIGENCE

NASTRAN SOL 700 – SLED with belt + Pretension

Courtesy of Raoul Spote (MSC)







10 runs, 2 parameters

Sled acceleration => X1

Pretension force => X2

Output Channel

X-acceleration of Dummy Head => Y1

Elapsed Time

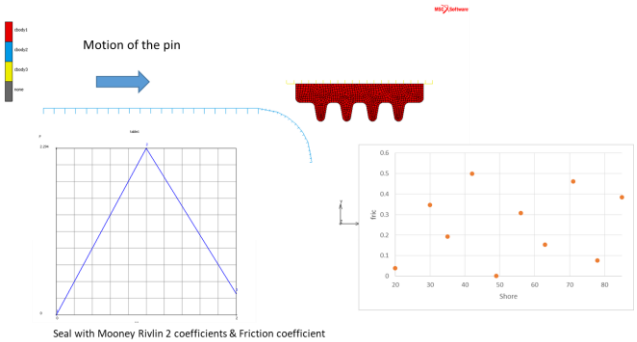
FE = ?

LUNAR = 8 sec

www.cadlm.com

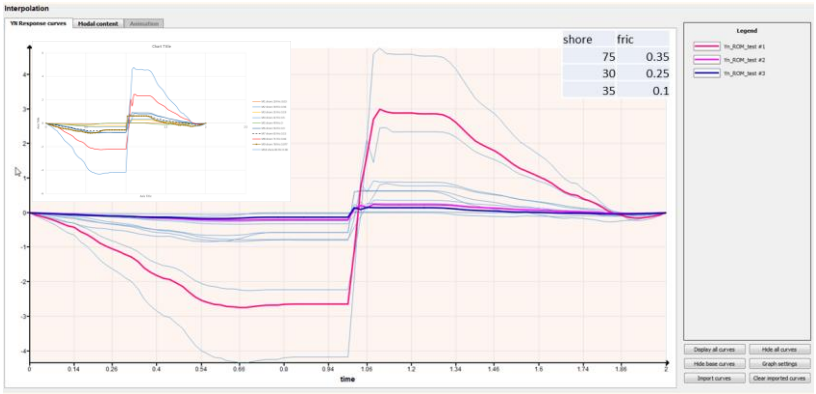
MARC – Pin to Seal contact

Courtesy of Raoul Spote (MSC)



Summary Pin to Seal Contact with Various Friction

# - Title	#012 - Pin to Seal Contact with Various Friction Models
Problem features	Rigid Pin inserted into and extracted from a Rubber Seal under following friction conditions: • No Friction Case • Arctangent with default sliding velocity • Arctangent with correct sliding velocity • Bilinear with default settings • Stick-Slip with default settings
Geometry	
Material properties	Neo-Hookean material with C_{10} = 50 N/cm²
Analysis type	Static with fixed time stepping
Boundary conditions	Contact is specified via contact tables. No explicit boundary conditions needed.
Element type	4-noded isoparametric element 10



10 runs, 3 parameters

Shore > pair or C10 and C01 Mooney coefficient

Friction coefficient

Output Channel

Pin force => Y1

Elapsed Time

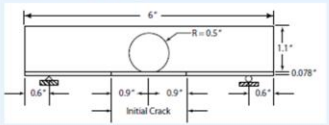
FE = 30 secs

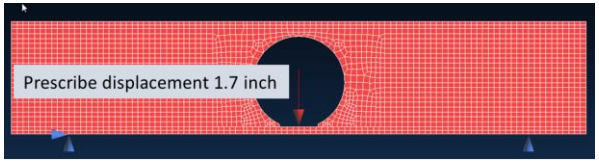
LUNAR = 1 sec

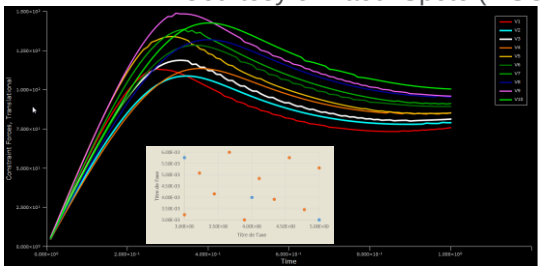
www.cadlm.com

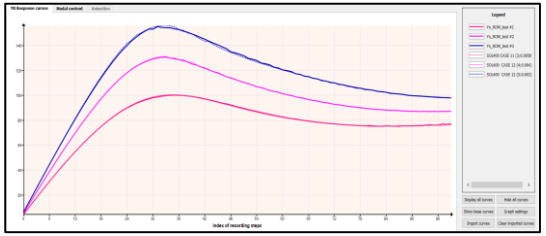
NASTRAN SOL400 – Composite plate delamination

Courtesy of Raoul Spote (MSC)

Title	Chapter 18: Composite Fracture and Delamination
Features	• VCCT based crack propagation • Cohesive zone modeling
Geometry	
Material properties	• Isotropic elastic material: E = 5000 ksi, ν = 0.3 • Cohesive material for interface elements: Exponential model used • Cohesive energy = 4.409 lb/in; critical opening displacement = 0.005 in
Analysis type	Quasi-static analysis
Boundary conditions	Simply supported as shown in the diagram above
Applied loads	Prescribed vertical displacement







10 runs, 3 parameters

CE => X1

D_open => X2

Output Channel

Reaction Force => Y1

Elapsed Time

FE = 30 secs

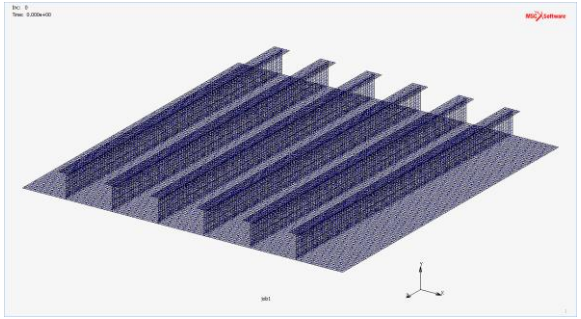
LUNAR = 1 sec

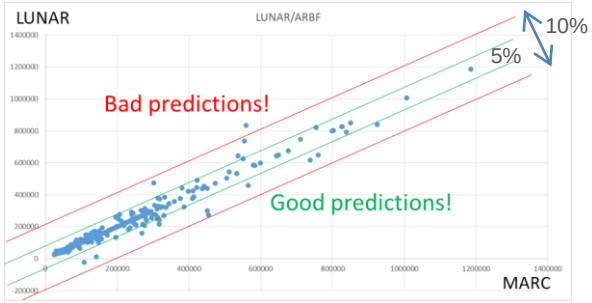
www.cadlm.com

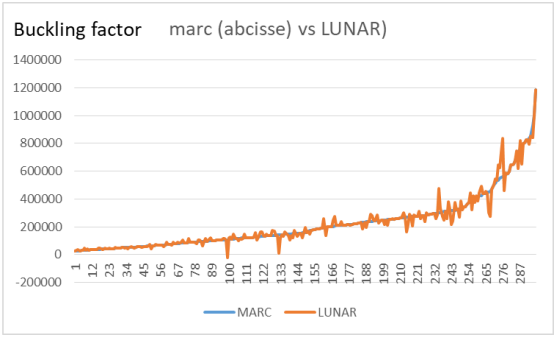
MARC – Buckling of composite panel

Courtesy of Jonni Sclauzero (MSC)

Unsupervised Learning







150 runs, 3 parameters

Nintervals => X1

Thickness => X2

Stiffners TYPE (I,L,T) => X3

Output Channel

Buckling coefficients => Y1

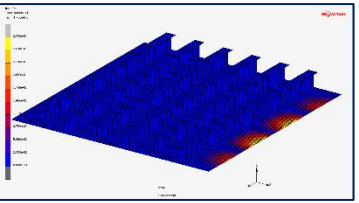
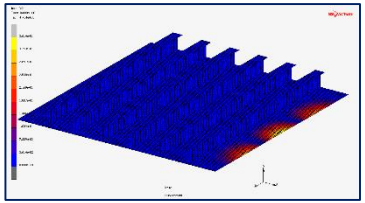
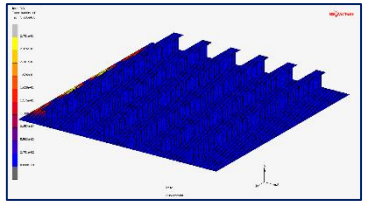
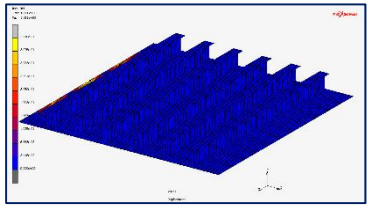
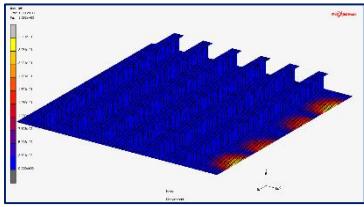
+ Buckling modes

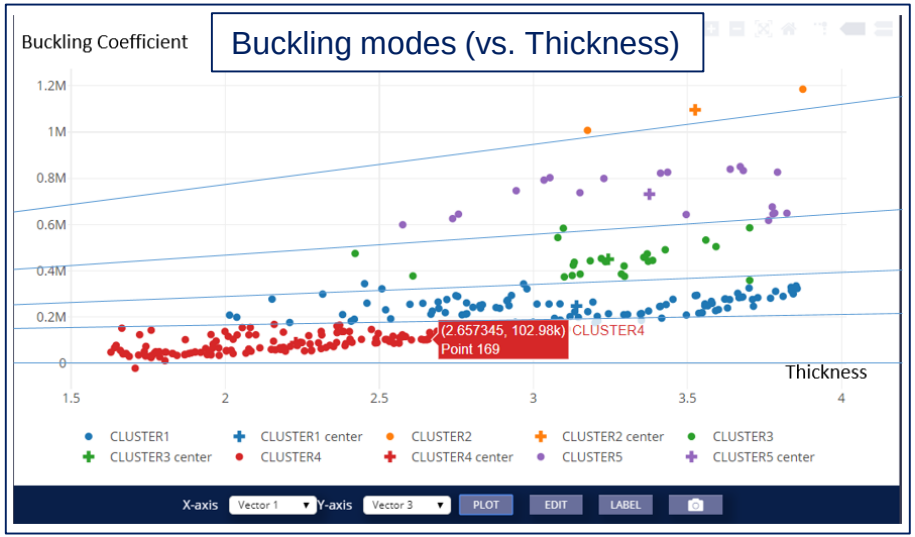
300 predictions

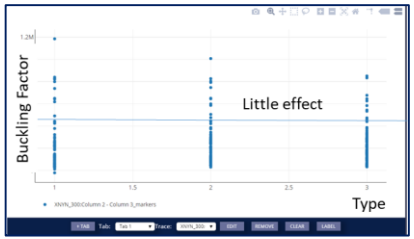
www.cadlm.com

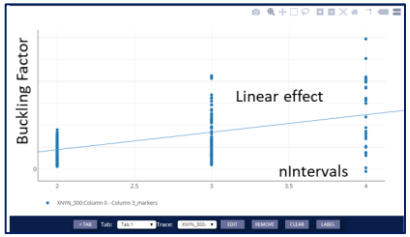
MARC – Buckling of composite panel

Unsupervised Learning







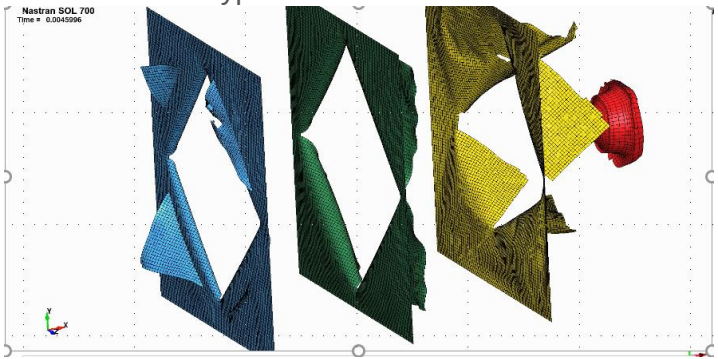
www.cadlm.com

NASTRAN SOL 700 – Perforation of composite panel

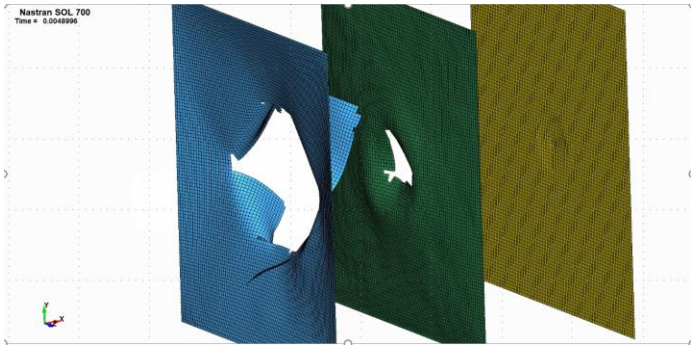
Courtesy of Jonni Sclauzero (MSC)

Objective : Find the optimal thickness distribution for plate1, plate2 and plate3

Typical simulation



Optimization with LUNAR



27 runs, 3 parameters

Thickness plate1, plate2, plate3 => X1, X2, X3

Output Channel

Bird displacement => Y1

Elapsed Time

Optimization with LUNAR = 15,42 secs

www.cadlm.com