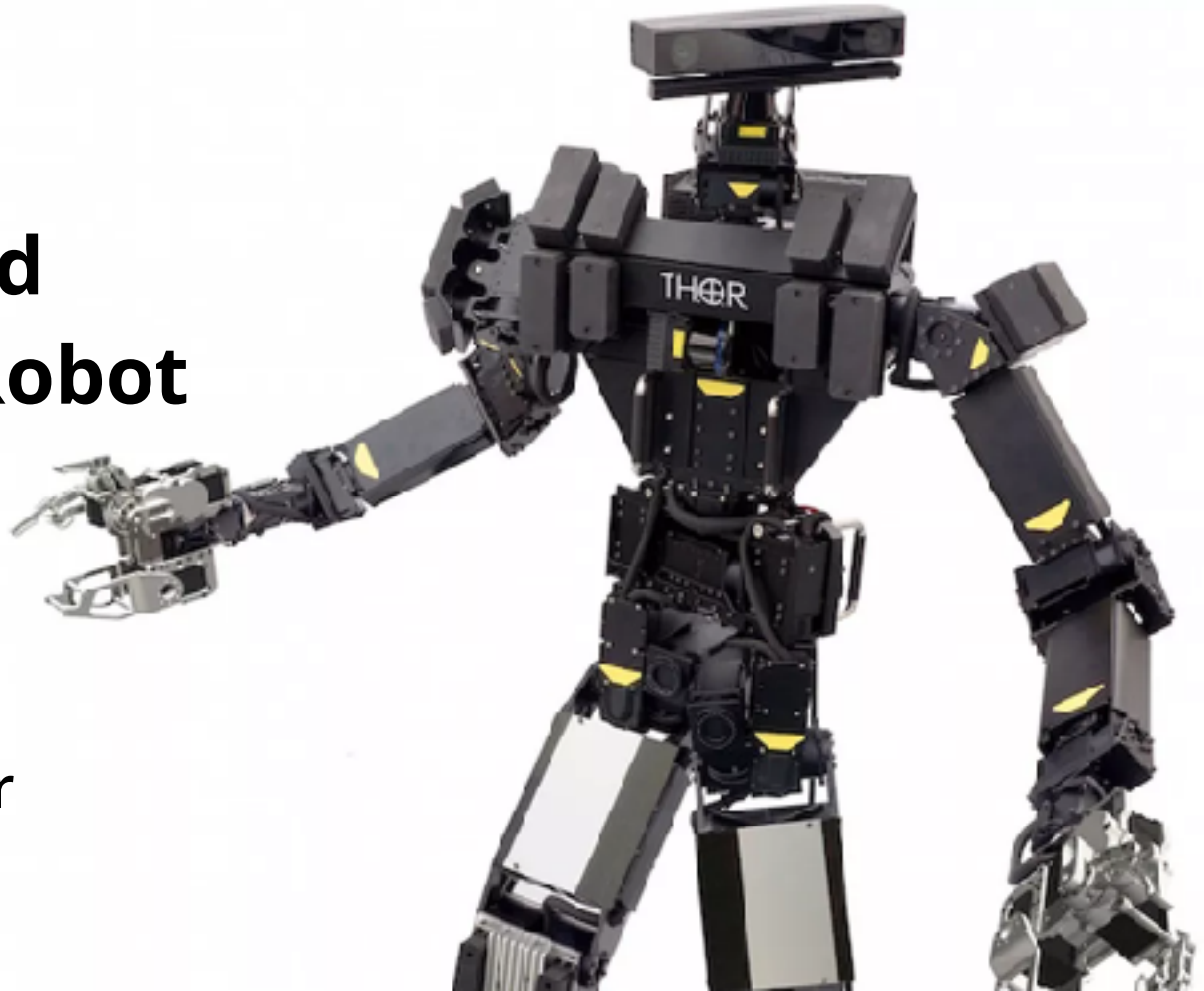


Chaos:

The Last Stand Against Our Robot Overlords

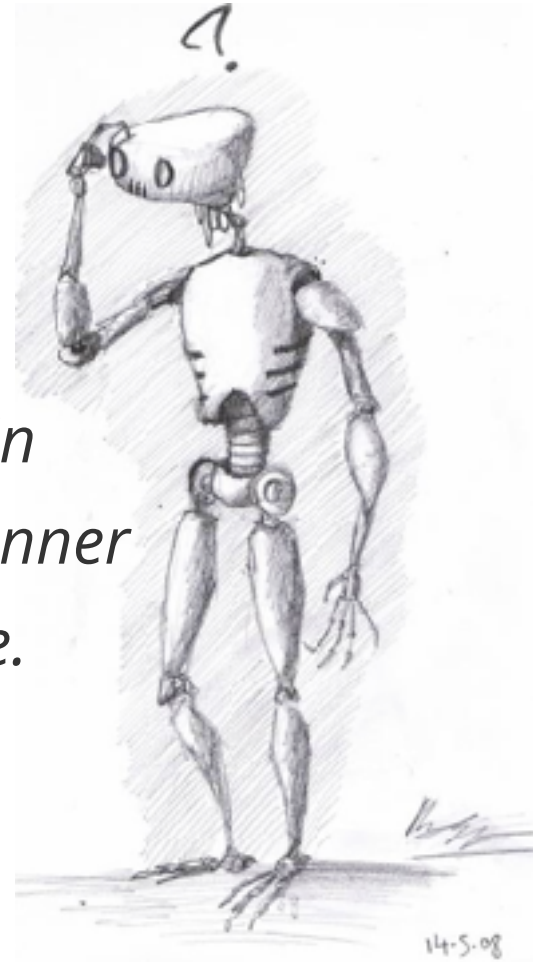
Nathan Äschbacher

 @gen_nja



Freezing Robot Problem:

Once the environment surpasses a certain level of dynamic complexity, the path planner decides that all forward paths are unsafe.



NH 
PARK & RIDE
BUS TERMINAL
EXIT 2









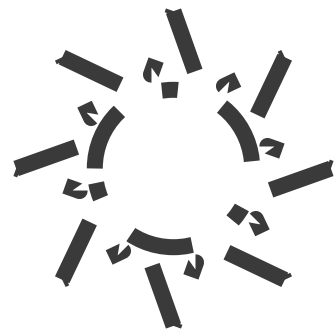
POLY**SYNC**TM



Core



DriveKit



HELIOS

01101



26262



01101



When are the models done?

Eleventy-Bazillion

Miles

01101



How do you know the software is safe?

שְׁמֵנוּ (שֵׁן) שְׁמֵנוּ

26262



How do you know the software is safe?

MISRA

HARD
realtime

26262

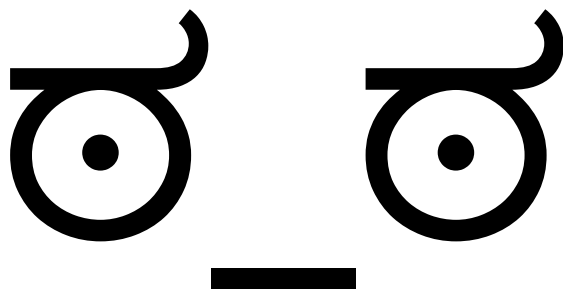


26262



But the AI isn't deterministic, so...?

זע (צו) זע



01101

26262



MIND THE GAP





Local Testing

Unit / Acceptance

Fuzz

Property-Based

Integration Testing

Chaos



Implementation



Formal Methods

Model Checking

Deductive Verification

Mutation

“It’s not all about introducing chaos to the system. It’s about the chaos inherent in the system itself.”

Chaos Engineering is about engineering practices that help us surface those systemic effects.”

-- Casey Rosenthal

Traffic & Chaos Manager

Netflix



Perception



Decision



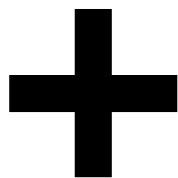
Control





;) | ;)

ದ_ದ



AUTODESK.

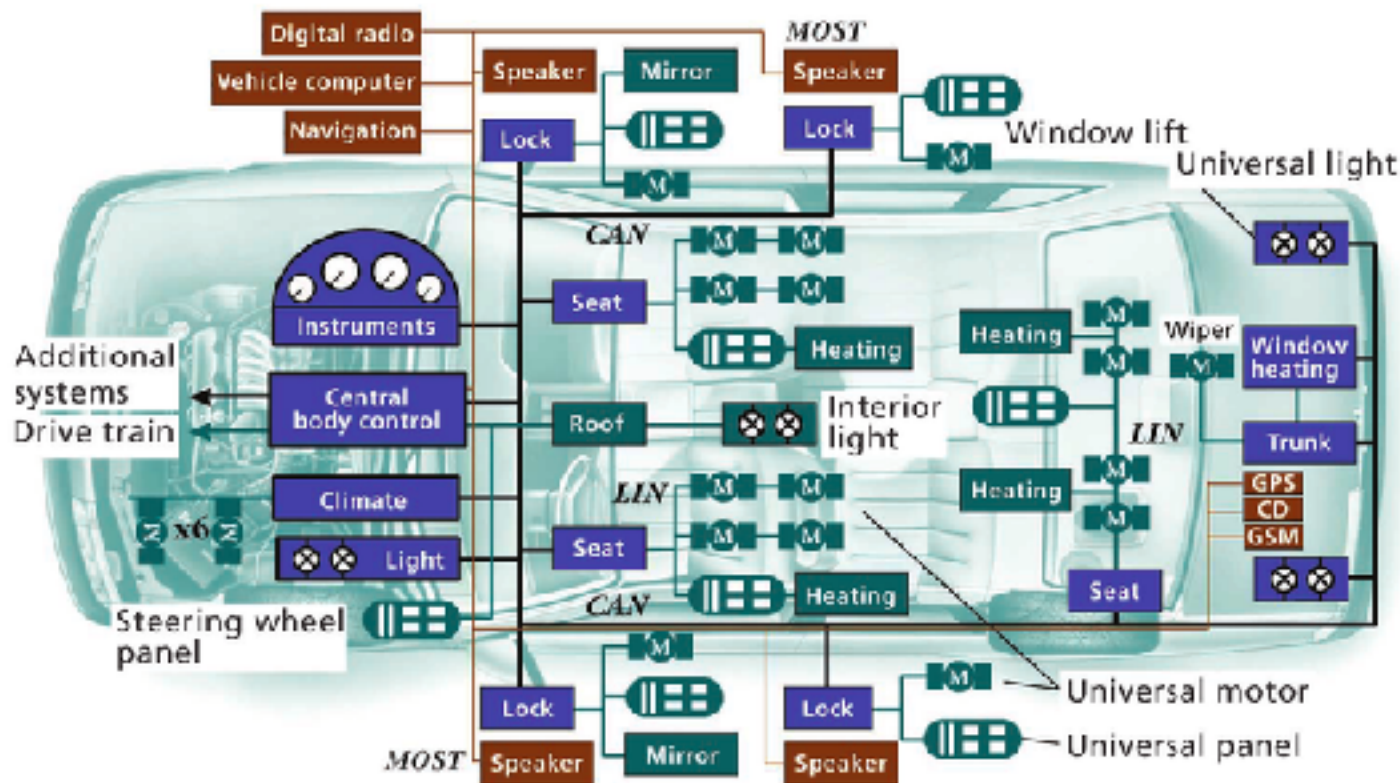


CORESLAB
STRUCTURES

DSI



Permittivity
Stiffness
Capacitance
Roughness
Compressive
Conductance
Viscosity
Elasticity
Flexibility
Durability
Resistance
Fatigue
Brittleness
Durability
Yield
Fracture
Ductility
Hardness
Flexural
Toughness
Shear
Plasticity
Stiffness
Permittivity
Capacitance
Roughness
Compressive
Conductance
Viscosity
Elasticity
Flexibility
Durability
Resistance
Fatigue
Brittleness
Durability
Yield
Fracture
Ductility
Hardness
Flexural
Tensile
Dielectric
Resilience



- CAN Controller area network
- GPS Global Positioning System
- GSM Global System for Mobile Communications
- LIN Local interconnect network
- MOST Media-oriented systems transport

“Chaos strongly prefers to experiment directly on production traffic.”

-- Principles of Chaos

“We don’t expect engineers to inject noise into the sensors of self-driving cars containing unsuspecting passengers!”

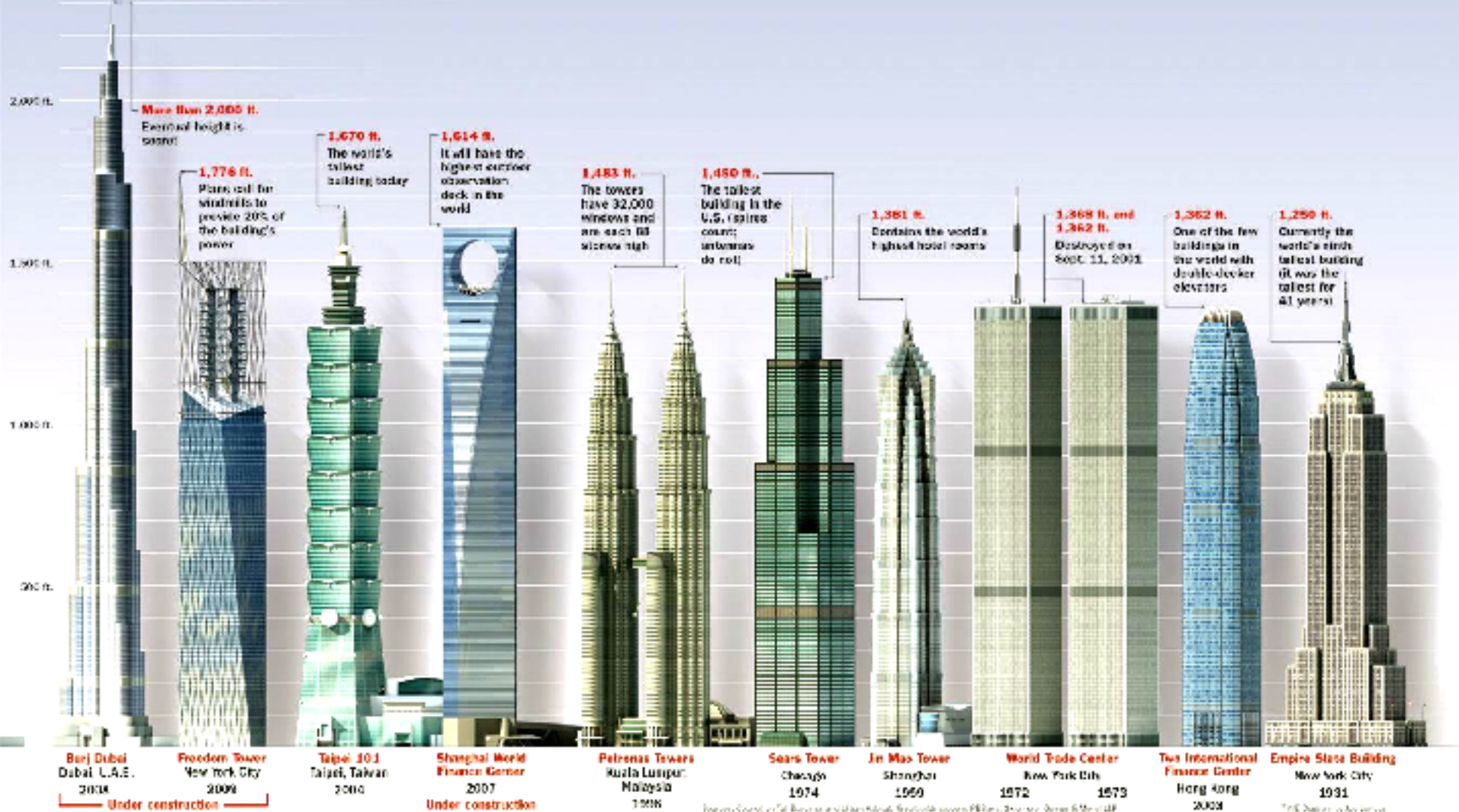
**-- Chaos Engineering
the Book**

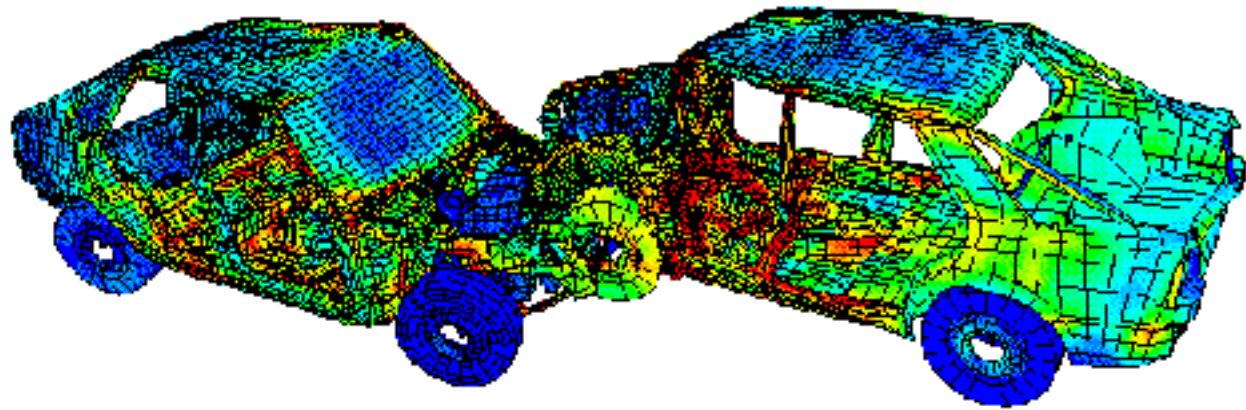
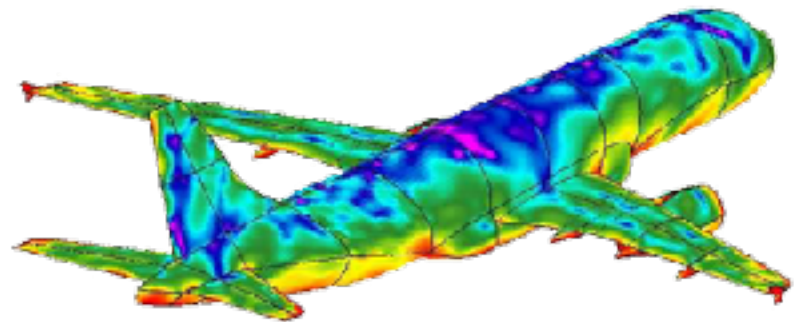
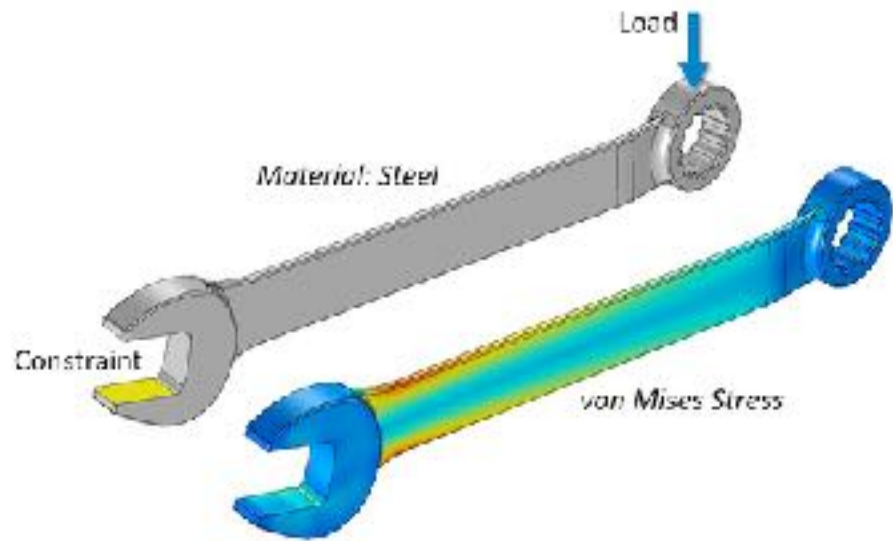
“ However, we suspect most users are not working on these kinds of safety-critical systems.”

**-- Chaos Engineering
the Book**

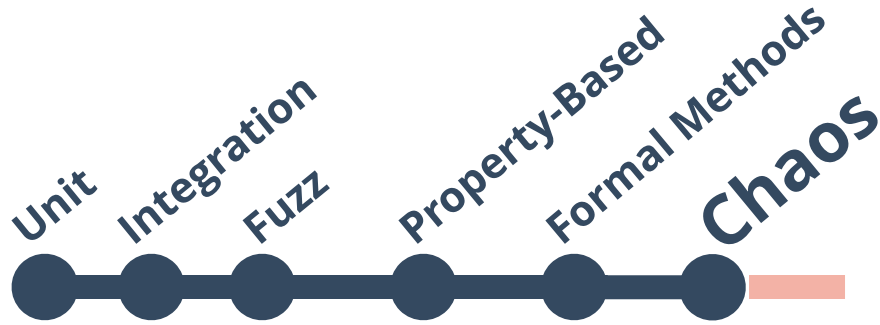








Over-Engineering

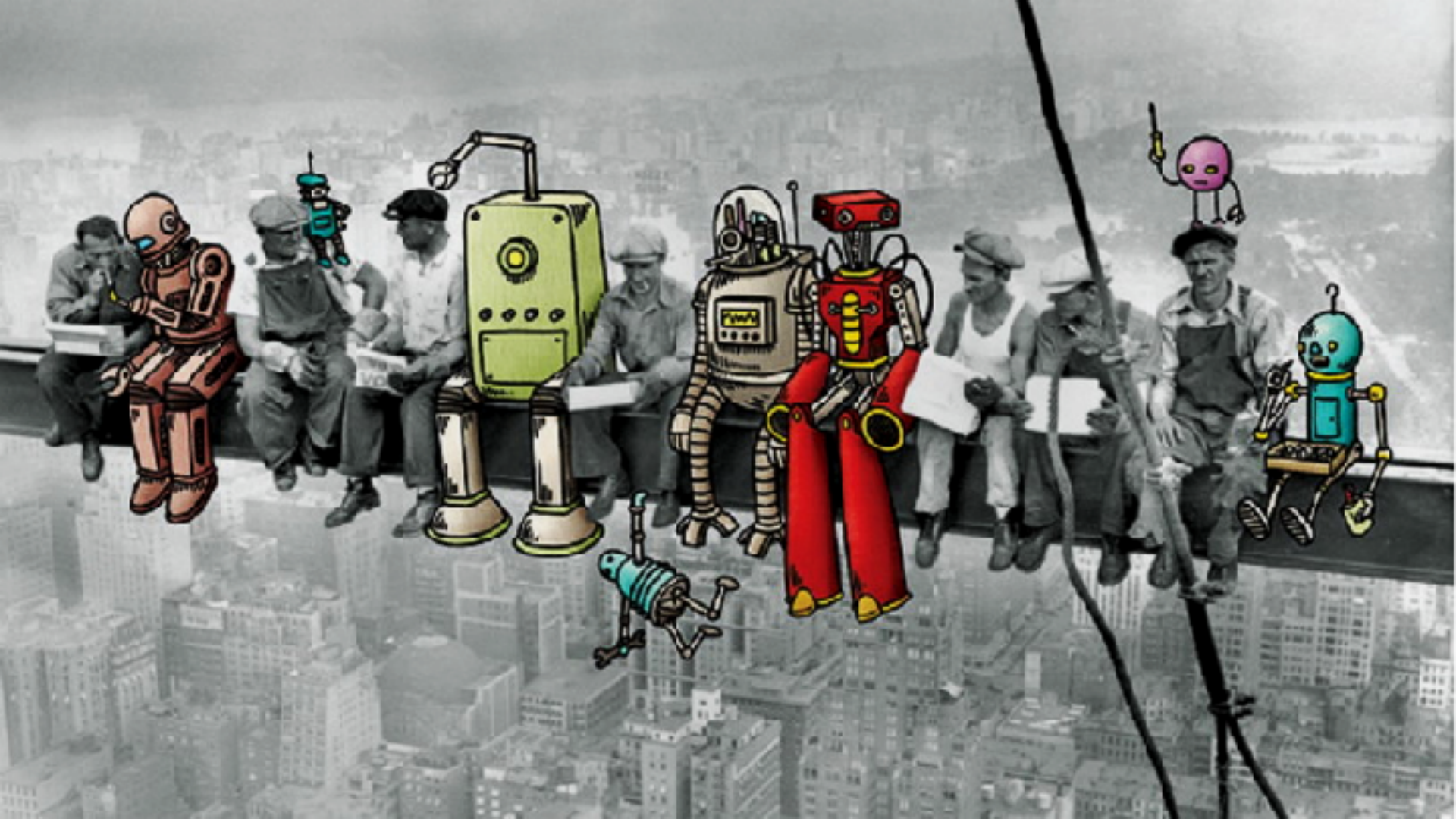


Software FEA ?



Good ol' Engineering





READING INSTRUCTIONS INSIDE

