

¹ Applied Computing and Mechanics Laboratory (IMAC) / ² Laboratoire de Mécanique et Génie Civil de Montpellier (LMGC)

Research concept

Imagine structures that could function like living systems changing their properties in response to changes in their environment...

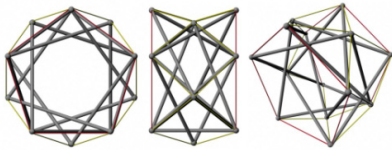
- Active structures adapt to changes in their environment by adjusting their properties.
- Deployable structures can modify their shape from compact to an expanded operational one.
- Tensegrity systems are made of struts and cables in a stable self-equilibrium and are particularly attractive for active and deployable structures due to low energy requirements.

Research objective

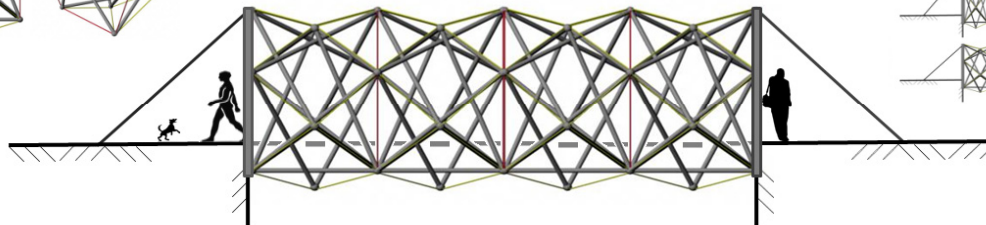
Design a tensegrity pedestrian bridge that can change shape and properties using the same active control system...

STRUCTURAL DESIGN

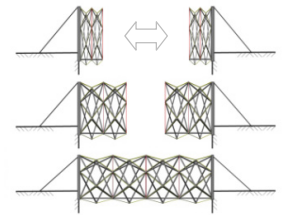
Search for an optimal form...



...design and analyze the bridge...

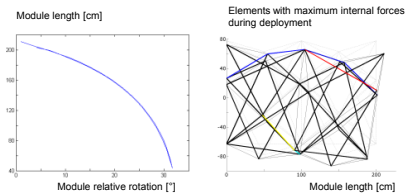


...and ensure deployment



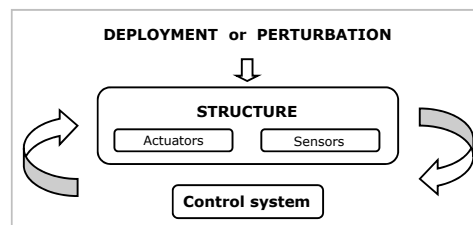
ACTIVE CONTROL DESIGN

Develop an analysis algorithm...

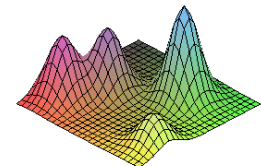


Deployment simulation using dynamic relaxation

...design the active control system...



...search for control commands



Complexity of the control-solution space: advanced computing required

EXPERIMENTAL VALIDATION

From small scale and CAD models...



via similitude and modeling

...to a near full-scale bridge-model

