Active and Deployable Structures: A Tensegrity Pedestrian Bridge

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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.

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

Search for an optimal form...
...design and analyze the bridge...
...and ensure deployment

Develop an analysis algorithm...
...design the active control system...
...search for control commands

Deployment simulation using dynamic relaxation

Complexity of the control-solution space: advanced computing required

From small scale and CAD models...
...to a near full-scale bridge-model

via similitude and modeling