Temperature reconstruction based on pointwise measurements

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Aim of the project:
Develop **structural control** methods for civil engineering structures taking into account the **exact vibrational** properties which depend on the **thermal state**


Semi-actively controlled bridge Dong-Ting, China

Only local temperature measurements available (sensors, inaccesible parts of the structure,...)

⇒ **Need to reconstruct the temperature field, given pointwise transient measurements**

- Least squares formulation with Tikhonov regularization
- The results depend on the minimization space: best results with the choice of H^1 space
- Various strategies developped in view of real-time computations
- Encouraging results so far...
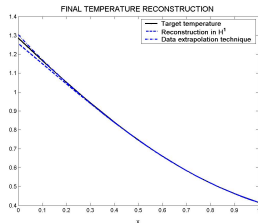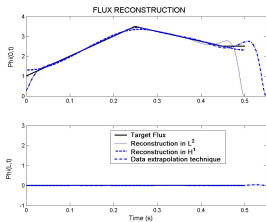
- Extension on 2D and 3D cases
- Comparison with other possible optimization methods (dual strategies, ...) - algorithm speed-up
- Experimental validation scheduled

Possible extensions:

- Optimization of the sensors positions
- Use of adaptive discretization algorithms for optimal efficiency
- Investigation of links with the observers theory