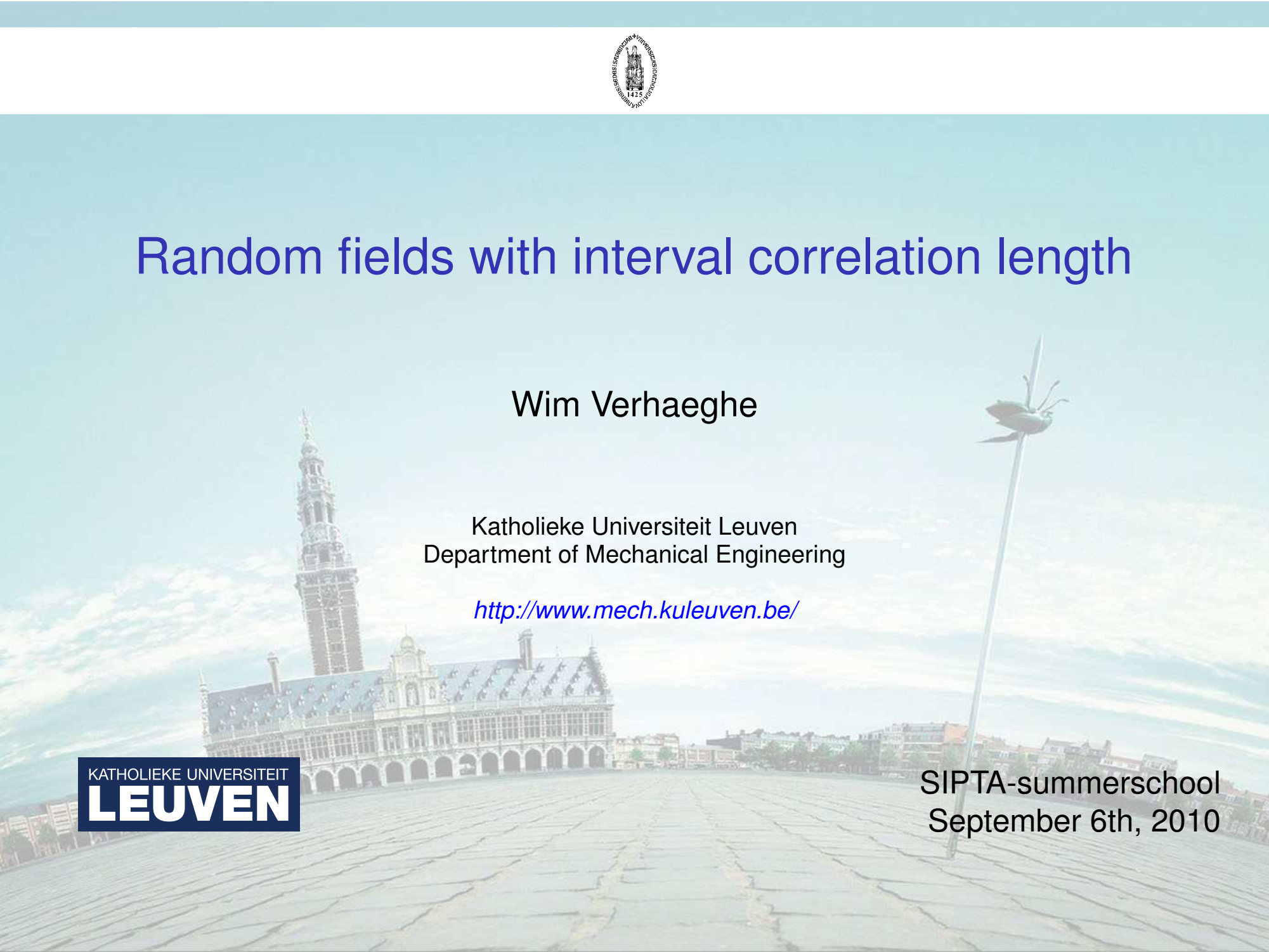

# Random fields with interval correlation length

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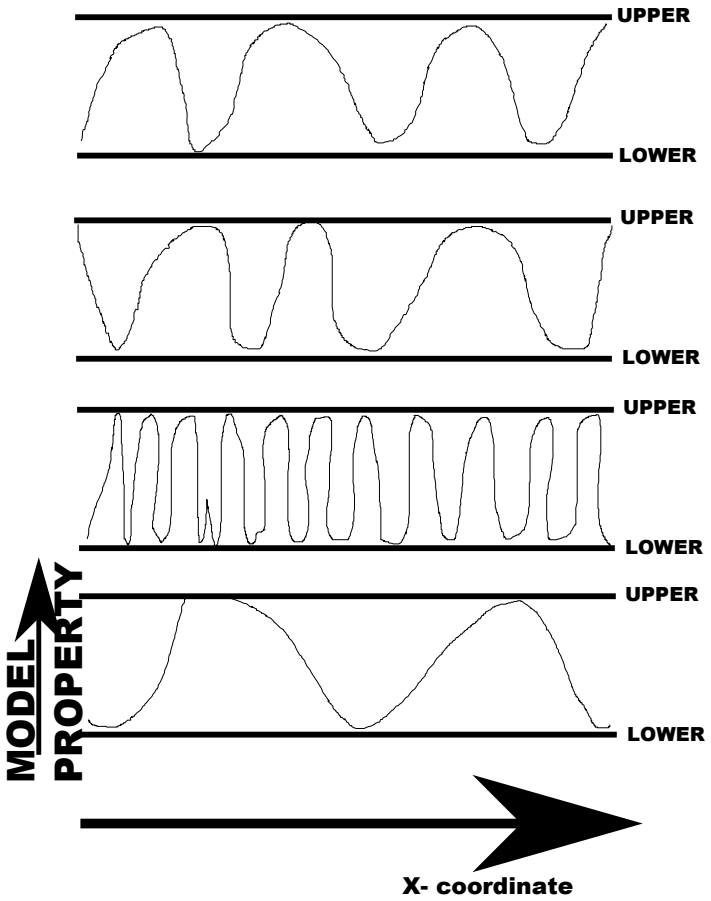
September 6th, 2010

# Problem

- Model property with spatial uncertainty:




- How to represent all the possible realisations?

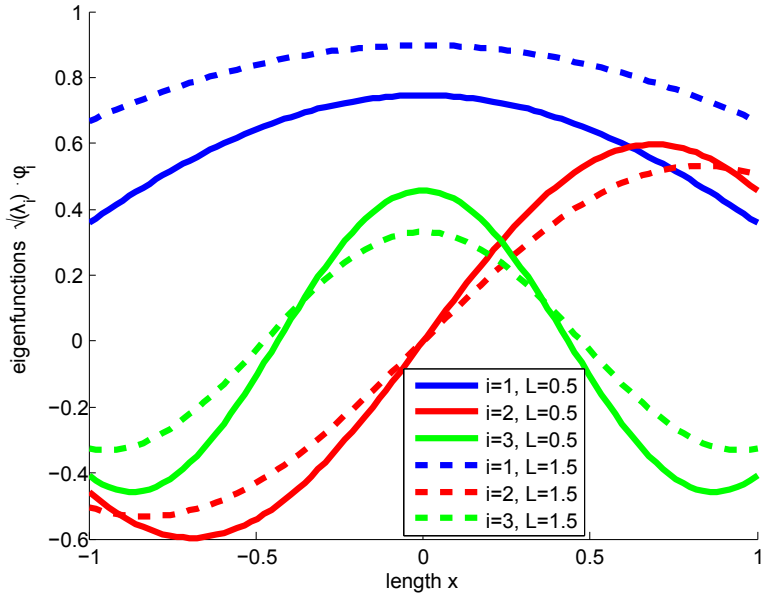
# Random Fields

- Assuming stationary.
- Assuming autocovariance function: $C_{HH}(\Delta x) = e^{-\frac{|\Delta x|}{L}}$
- Assuming correlation length: $L$

$$\rightarrow \int_{\Omega} C_{HH}(\mathbf{x_1}, \mathbf{x_2}) \varphi_i(\mathbf{x_2}) d\Omega_{\mathbf{x_2}} = \lambda_i \varphi_i(\mathbf{x})$$

Reasonable?

- NO: pretending to know things we don't know (with serious impact).
- yes: Clustering information, capturing uncertainty in spatially coherent structures.



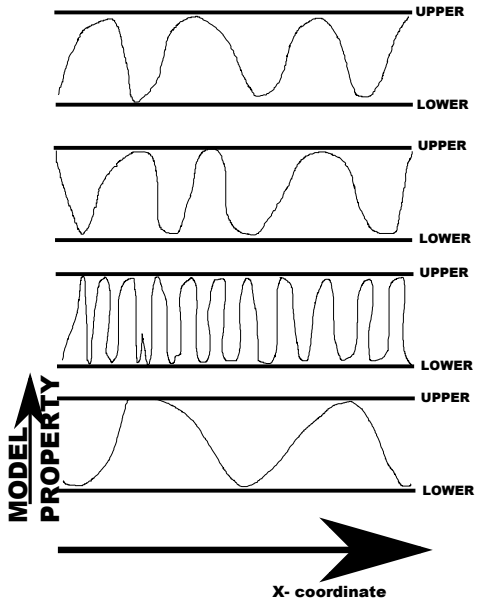
# Other ways

- Assuming stationary.
- Assuming autocovariance function: $C_{HH}(\Delta x) = e^{-\frac{|\Delta x|}{L}}$
- Assuming correlation length $L$ to be an interval.

$\rightarrow$ Perform spectral decomposition for some values of $L$ and then interpolate the eigenfunctions.

# Problem

- Model property with spatial uncertainty:




- How to represent all the possible realisations?
  'It are the covariances that are the bitches!'
- Credal sets only for uncertain covariances?
- How to propagate this through a FE-analysis?