Monitoring of Structural Health and Geohazards

CEGM2008

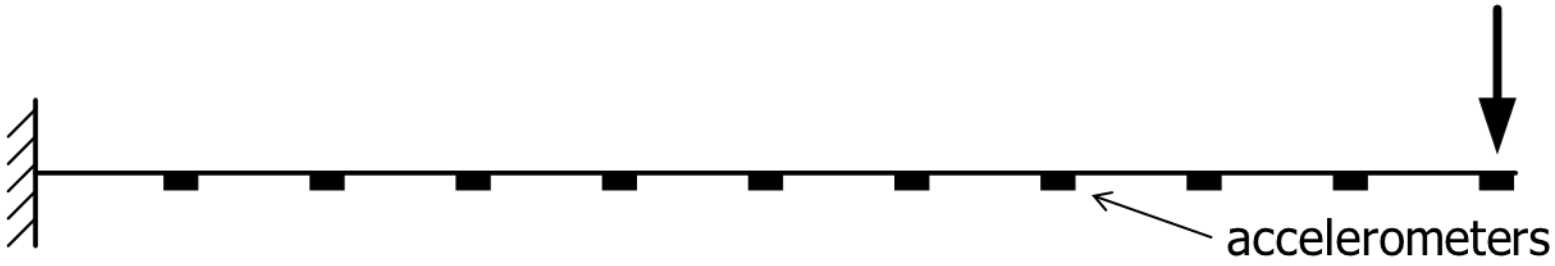
TU Delft

Workshop 3.2 System identification: Frequency Domain Decomposition

Eliz-Mari Lourens

TU Delft

Identify the dynamic properties of the beam using 10 measured accelerations



- system_identification.ipynb
- Excitation applied at the tip:
  - broadband stochastic (0-5000 Hz) superposed upon
  - harmonic at 100 Hz
- 10 (contaminated) vertical accelerations measured along the length of the beam

Tasks

1. Calculate the acceleration of the beam at the sensor locations and plot
2. Use the (contaminated) accelerations to identify the first 5 natural frequencies and mode shapes of the beam
3. Calculate the global MAC matrix and comment

Q: What is the rank of the spectral matrix at the different frequencies and why?

Theory needed for frequency domain decomposition

1. Singular value decomposition
2. Frequency domain decomposition
3. Averaging of the spectral densities
4. Modal Assurance Criterion (MAC)

→ See lecture slides on system identification and modal testing.