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## **Cross flow induced vibration in a single tube of square array using Large Eddy Simulation**

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### **Abstract**

*Large eddy simulations (LES) of a single phase water flow through square normal tube bundle at Reynolds numbers from 2000 to 6000 is performed to investigate the fluidelastic instability. A single cylinder is allowed to oscillate in one degree of freedom (1-DOF) in flow normal direction, similar as in experiments. The fluid-structure coupling is simulated using the Arbitrary Lagrangian-Eulerian (ALE) approach. The sub-grid scale turbulence is modeled using standard Smagorinsky's eddy-viscosity model. The LES results show good agreement with experimental results in terms of the response frequency and damping ratio of the cylinder. The dynamic case simulations are compared with static cases over the range of Reynolds numbers by means of the probe velocity spectra and pressure profiles on the cylinder surface.*

### **References**

[1] Shinde 2015, Phd thesis, Fluidelastic instability in heat exchanger tube arrays and a Galerkin-free model reduction of multiphysics systems.