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Generalized "thick" strip modelling for vortex-induced vibration of long flexible cylinders[1] YAN BAO, RAFAEL PALOCIOS, SPENCER SHERWIN, Imperial College London, NEKTAR++ COLLABORATION — We propose a generalized strip modelling method that is computationally efficient for the VIV prediction of long flexible cylinders in three-dimensional incompressible flow. In order to overcome the shortcomings of conventional strip theory-based 2D models, the fluid domain is divided into "thick" strips, which are sufficiently thick to locally resolve the small scale turbulence effects and three dimensionality of the flow around the cylinder. An attractive feature of the model is that we independently construct a three-dimensional scale resolving model for individual strips, which have local spanwise scale along the cylinder's axial direction and are only coupled through the structural model of the cylinder. Therefore, this model is able to cover the situations of fully resolved 3D model and 2D strip theory model. The connection between these strips is achieved through the calculation of a tensioned beam equation, which is used to represent the dynamics of the flexible body. In the limit, however, a single "thick" strip would request the full 3D domain. A parallel Fourier spectral/*hp* element method is employed to solve the 3D flow dynamics in the strip-domain, and then the VIV response prediction is achieved through the strip-structure interactions.

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