

An explicit threshold for the appearance of lift on the deck of a bridge

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Abstract

We set up the analytical framework for studying the threshold for the appearance of a *lift force* exerted by a viscous steady fluid (the wind) on the deck of a bridge. We model this interaction as in a wind tunnel experiment, where at the inlet and outlet sections the velocity field of the fluid has a *Poiseuille flow* profile. Since in a symmetric configuration the appearance of lift forces is a consequence of non-uniqueness of solutions, we compute an explicit threshold on the incoming flow ensuring uniqueness. This requires building an explicit solenoidal extension of the prescribed Poiseuille flow and bounding some embedding and cutoff constants. It is a joint work with Filippo Gazzola (Politecnico di Milano, Milan).