

Abstract Submitted
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Flexible body with drag independent of the flow velocity THOMAS BAROIS, EMMANUEL DE LANGRE, LadHyX, Ecole Polytechnique, MECHANICS AND LIVING SYSTEMS TEAM — The drag of a rigid object is expected to increase with flow velocity. For wide ranges of velocities commonly found, the drag increases as the square of the relative velocity of the fluid. This strong dependence of the load with velocity accounts for specific survival strategies adopted by passive living systems such as plants in wind or algae in marine environments: through elastic reconfiguration, the drag on plants is reduced when compared to a rigid configuration and the velocity exponent for the drag is typically found between 1 and 1.5. In this work, a flexible body conceptual model is presented that exhibits a drag force that is almost independent of the free stream velocity. This surprising result is shown to be remarkably robust as it is experimentally observed for a range of geometries. This study opens the way for the design of devices subjected to a drag that is independent of the flow velocity. This possibility constitutes a key point in various fields involving flexible structures that are towed or subjected to wind.

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