Viscous Liquid Flow Past an Obstacle at Arbitrary Reynolds Number

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Lecture 1-2:

In this short two-lecture course, I shall provide a ride through one of the oldest and most investigated problems in fluid mechanics, namely, the motion of a viscous liquid past a rigid obstacle. Assuming that the flow is uniform at large spatial distance (infinity) from the body, I will be mainly focused on the determination of the flow characteristics for Reynolds numbers, Re, of arbitrary size. Thus, besides the basic issue of existence, the latter will include the occurrence of (multiple) steady and time-periodic bifurcating solutions, along with a quick (and, unfortunately, to date still incomplete) glance at the behavior in the limit of very large *Re*. A number of open questions (”doable” and “un-doable”) will also be presented. Notice that, as Re increases further and rapidly, the liquid is, figuratively speaking, put “under a lot of pressure”, in that it has hastly to decide what is the most convenient motion to perform, in order to allocate/distribute all the energy that is pumped in. This explains the relation between my lectures and the title of the School.