ATTRACTORS FOR A FLUID-STRUCTURE INTERACTION PROBLEM WITH TIME-DEPENDENT PHASE SPACE

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This talk will be concerned with the longterm dynamics of a fluid-structure interaction problem describing a Poiseuille inflow through a 2D channel containing a rectangular obstacle. Physically, this models the interaction between the wind and the deck of a bridge in a wind tunnel experiment, as time goes to infinity. Due to the nature of the interaction problem, the fluid domain depends on time in an unknown fashion. As a result, the solution operator associated to the system acts on a time-dependent phase space, and it cannot be described in terms of a semigroup nor of a process. Nonetheless, we are able to extend the notion of global attractor to this particular setting, and prove its existence and regularity. This provides a strong characterization of the asymptotic behavior of the problem. Moreover, when the inflow is sufficiently small, the attractor reduces to the unique stationary solution of the system, corresponding to a perfectly symmetric configuration. See also [1].

This is a joint work with Filippo Gazzola, Vittorino Pata.

References

[1] F. Gazzola, V. Pata and C. Patriarca, *Attractors for a fluid-structure interaction problem with time-dependent phase space*, Preprint, 2022.

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