Workshop on Nonlinear Analysis and Control Theory in
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Exponential convergence towards consensus for non-symmetric linear first-order systems in finite and infinite dimensions

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Abstract

I will first recall some results on how to achieve consensus for well known classes of systems, like the celebrated Cucker-Smale or Hegselmann-Krause models. When the systems are symmetric, convergence to consensus is classically established by proving, for instance, that the usual variance is an exponentially decreasing Lyapunov function: this is a "L^2 theory". When the systems are not symmetric, no L^2 theory existed until now and convergence was proved by means of a "L^∞ theory". In this talk I will show how to develop a L^2 theory by designing an adequately weighted variance, and how to obtain the sharp rate of exponential convergence to consensus for general finite and infinite-dimensional linear first-order consensus systems. If time allows, I will show applications in which one is interested in controlling vote behaviors in an opinion model.

Joint work with:
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References

[1] Boudin, Laurent; Salvarani, Francesco; Trélat, Emmanuel, *Exponential convergence towards consensus for non-symmetric linear first-order systems in finite and infinite dimensions*, Preprint Hal (2021), 18 pages.

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