

# Analysis of a wingtip vortex using Higher Order Dynamical Mode Decomposition

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## Resumen

Wingtip vortices are a key element to take into account in the design of any aerial vehicle and the planning of takeoff and landing operations on large-scale airports. In this project, we study the wingtip vortex generated by a wing model in a controlled environment. Specifically, the flow velocity field measured in the wake of a NACA0012 model is analyzed using Higher Order Dynamical Mode Decomposition (HODMD) [1]. That velocity field was obtained using the PIV technique in a towing tank at University of Málaga at a moderate Reynolds number of 40,000. By using HODMD we were able to extract the modes that capture the dissipation of the vortex and characterize its temporal decay. These modes are crucial for the analysis of any element designed to decrease the vortex intensity. These devices, active and passive, are vital in any modern aeronautical application.

## Referencias

- [1] S. Le Clainche and J. M. Vega, *Higher Order Dynamic Mode Decomposition*, Journal on Applied Dynamical Systems, vol. 0, 2017