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A COMPARATIVE POD/DMD ANALYSIS OF CANONICAL AND ACTUATED TURBULENT CHANNEL FLOWS

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Turbulent flow fields contain a wide range of spatio-temporal scales. Direct Numerical Simulation techniques provide an accurate description of turbulent flow fields. This accuracy comes at the expense of high computational cost and memory footprint.

In this context, feature detection algorithms are useful tools that help to identify relevant flow structures, their interactions and ulterior evolution.

In this contribution, we employ feature detection algorithms to analyze canonical and controlled turbulent channel flows. Specifically, we will apply both Proper Orthogonal Decomposition and Dynamic Mode Decomposition to DNS-generated turbulent channel flow data-bases.

The ultimate goal is to reveal whether flow features linked to drag reduction exist and, if that is the case, learn how those structures could be enhanced, thus leading to more efficient drag reduction strategies.