

Abstract Submitted
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Disturbance Source Separation in Shear Flows Using Blind Source Separation Methods IGAL GLUZMAN, JACOB COHEN, YAAKOV OSHMAN, TECHNION — A novel approach is presented for identifying disturbance sources in wall-bounded shear flows. The method can prove useful for active control of boundary layer transition from laminar to turbulent flow. The underlying idea is to consider the flow state, as measured in sensors, to be a mixture of sources, and to use Blind Source Separation (BSS) techniques to recover the separate sources and their unknown mixing process. We present a BSS method based on the Degenerate Unmixing Estimation Technique. This method can be used to identify any (a priori unknown) number of sources by using the data acquired by only two sensors. The power of the new method is demonstrated via numerical and experimental proofs of concept. Wind tunnel experiments involving boundary layer flow over a flat plate were carried out, in which two hot-wire anemometers were used to separate disturbances generated by disturbance generators such as a single dielectric barrier discharge plasma actuator and a loudspeaker.

Igal Gluzman
TECHNION

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