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Feature detection and Proper Orthogonal Decomposition of time resolved velocity data for flow separation over an elliptical leading edge. DANIEL MORSE[1], JAMES LIBURDY, Oregon State University — In this study the flow characteristics over a fixed surface, flat, low aspect ratio thin wing are investigated. Of interest is the dynamic separation process for a range of angle of attacks, and chord Reynolds numbers, particularly the time dependent nature of the vortex development, convection and interactions. Angle of attack is varied from 14° to 20°. The Reynolds number based on chord length ranges from 14,700 to 66,700; this corresponds to a velocity range between 1.75 and 5.0 m/s. Time Resolved Particle Image Velocimetry (TRPIV) is used to obtained time resolved velocity information near the leading edge. Using discrete vortex detection schemes coupled with a high pass filtering and Proper Orthogonal Decompostion (POD) analysis, the time dependent characteristics of this flow is elucidated. Methods of vortex detection include the λ_2 method proposed by Jeong and Hussain [1995] and Large Eddy Simulation (LES) filtering. The POD reveals a low number of high energy, dominant modes of velocity variation for most cases.

[1]PhD candidate

Daniel Morse
Oregon State University

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