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Localized edge states in the asymptotic suction boundary layer. (English) Zbl 1284.76106
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Summary: The dynamics on the laminar-turbulent separatrix is investigated numerically for boundary-layer flows in the subcritical regime. Constant homogeneous suction is applied at the wall, resulting in a parallel asymptotic suction boundary layer (ASBL). When the numerical domain is sufficiently extended in the spanwise direction, the coherent structures found by edge tracking are invariably localized, and their dynamics shows bursts that drive a remarkable regular or irregular spanwise dynamics. Depending on the parameters, the asymptotic dynamics on the edge can be either periodic in time or chaotic. A clear mechanism for the regeneration of streaks and streamwise vortices emerges in all cases and is investigated in detail.

MSC:

- 76D10** Boundary-layer theory, separation and reattachment, higher-order effects Cited in 15 Documents
- 76M45** Asymptotic methods, singular perturbations applied to problems in fluid mechanics
- 76F06** Transition to turbulence

Keywords:

boundary layers; instability; nonlinear dynamical systems

Software:

SIMSON

Full Text: [DOI](#)

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