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Computations for laminar flow control in swept-wing boundary layers.[1] HELEN REED, RICHARD RHODES, WILLIAM SARIC, Texas A&M University — The laminarization of a swept-wing boundary layer by the introduction of passive spanwise-periodic roughness elements (DRE) near the leading edge is modeled by linear stability theory and nonlinear parabolized stability equations. Studies predict that, for chord Reynolds numbers of 8 million and with an appropriate pressure coefficient design, the crossflow instability can be stabilized and laminar flow achieved. Sensitivity to element placement and height is studied, and it is shown that the optimum location for the control elements is at the Branch I neutral point of the control wavelength. This work serves as a companion to flights tests of a swept-wing model mounted below the wing of a Cessna O-2 aircraft at Texas A and M's Flight Research Laboratory.

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