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Study of Discrete Modes Branching in High-Speed Boundary Layers[1] ANATOLI TUMIN, The University of Arizona, YULI LIFSHITZ, DAVID DEGANI, Technion-Israel Institute of Technology — The branching of discrete modes in high-speed boundary layers is investigated using the Parabolized Stability Equations (PSE). The fast and slow discrete modes associated with the fast and slow acoustic modes, respectively, are considered in high-speed boundary layers over adiabatic and cooled walls. Whereas the conventional Linear Stability Theory approach leads to singular behavior in the vicinity of the fast mode synchronization with the entropy and vorticity modes, the PSE results do not reveal singular behavior of the solution and are consistent with the available Direct Numerical Simulations of perturbations in high-speed boundary layers. Also, the PSE results do not reveal a singular behavior at the point of synchronism of the slow and fast discrete modes.

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