

Abstract Submitted
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The Mack's amplitude method revisited¹ ANATOLI TUMIN, University of Arizona, ALEXANDER FEDOROV, Moscow Institute of Physics and Technology — Mack (1977) criticized methods referring to a single frequency perturbation for correlation of transition prediction because the external disturbance source should have a broad band spectrum. Delta-correlated perturbations are characterized by the mean square of physical amplitude, which is expressed as a double integral of the spectral density square in frequency and the spanwise wave number. It is suggested to evaluate this integral asymptotically. The results obtained using the asymptotic method and direct numerical integration are compared with ad hoc approaches for high speed and moderate supersonic boundary layers. This allows us to suggest recommendations on rational usage of the amplitude method with avoiding unconfirmed simplifications while reducing the computational effort to the level affordable for engineering practice.

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