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An overview of global stability analysis VASSILIOS THEOFILIS, The University of Liverpool — Approaches employed to access a subset of the eigenspectrum of the linearized Navier-Stokes equations operator describing global instability of laminar flows over or through geometries with multiple inhomogeneous spatial directions are overviewed. The observation is made that in the incompressible limit numerical methods developed over the last two decades have now reached a state of maturity that permits employing any of the well-documented time-stepping or matrix-forming approaches to predict (in)stability of a given flow. A particular wall-boundary closure that permits accurate recovery of 2D and 3D eigenspectra on collocated grids will be highlighted. Far less attention has been paid to-date to global instability of compressible flows. The most promising recent developments in methods for the efficient extraction of quasi-3D compressible flow global instabilities will be outlined. Finally, issues pertaining to laminar hypersonic flow instability, relating with large slip velocities at tips of cones and leading edges of lifting surfaces, will be discussed and novel instability analysis methodologies based on linearization of the probability distribution function will be discussed.

Vassilios Theofilis
The University of Liverpool

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