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Counterflow laminar gas jets issuing from aligned planar nozzles ADAM WEISS, WILFRIED COENEN, ANTONIO L SANCHEZ, University of California San Diego — The laminar flow resulting from the impingement of two gaseous jets issuing from aligned planar nozzles of semi-width R separated a distance $2H$ is investigated by numerical and analytical methods, with specific consideration given to the high-Reynolds and low-Mach number conditions typically present in counterflow-flame experiments. The resulting flow, nearly inviscid and effectively incompressible, can be described by using a density-weighted stream-function/vorticity formulation that removes the need to consider specifically the boundary separating the two jet streams. Besides the geometric parameter H/R, the solution depends only on the shape of the velocity profiles in the feed streams and on the jet momentum-flux ratio Λ. While conformal mapping can be used to determine the potential solution corresponding to uniform feed-stream velocity profiles, numerical integration is required in general to compute vortical flows, including those arising with Poiseuille velocity profiles, with simplified solutions found in the limits $H/R \ll 1$ and $H/R \gg 1$.

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