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**Buoyancy effects in a wall jet over a heated horizontal plate** RAMON FERNANDEZ-FERIA, FRANCISCO CASTILLO-CARRASCO, Universidad de Malaga (Spain) — A similarity solution of the boundary layer equations for a wall jet on a heated horizontal surface taking into account the coupling of the temperature and velocity fields by buoyancy is described. It exists for any positive value of $\Lambda = Gr/Re^2$, characterizing this coupling between natural and forced convection over the horizontal plate; i.e., only when the plate temperature is larger than the ambient one. The flow structure is qualitatively very different from the well known Glauert's similarity solution for a wall jet without buoyancy effects ($\Lambda = 0$): basically coincides for both a radially spreading jet and a two-dimensional jet, and the maximum of the horizontal velocity increases as the jet spreads over the surface, with the power 1/5. The similarity solution is checked by solving numerically the boundary layer equations for a jet with uniform velocity and temperature emerging from a slot of height $\delta$ and radius $r_0$ (in the radial case). An approximate, analytical similarity solution near the jet exit is also found that helps to start the numerical integration. The similarity solution is reached for any set of the non-dimensional parameters governing the problem provided that the plate is heated ($\Lambda > 0$).

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