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Hydraulic jumps in one dimension TOMAS BOHR, ANDERS ANDERSEN, The Technical University of Denmark, DANIEL BONN, FARID BOURAMRIRENE, LPS, Ecole Normale Superieur, Paris — We present a study of hydraulic jumps in thin fluid layers with flow predominantly in one direction, created either by confining the flow to a narrow channel or by providing an inflow in the form of a narrow sheet. In all cases we find that the (normal) velocity of the flow at the low side of the jump has a particular critical value, larger than the wave speed. In the channel flow we clearly demonstrate the linear height profile predicted by Watson (1964), although turbulent fluctuations change the apparent viscosity. We show how to calculate the flow structure through the jump, where separation occurs. In the sheet case we find that the jump has the shape of a lozenge with sharply defined, oblique shocks. The variation of the angle of the lozenge with flux is determined by the condition that the normal velocity at the jump remains at the critical value.

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