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Shock Capturing Anomalies and the Jump Conditions in One Dimension DANIEL ZAIDE[1], PHILIP ROE[2], University of Michigan, CRASH TEAM — In this work we examine how the nonlinearity of the Rankine-Hugoniot jump conditions dictates the behavior of shock capturing methods, particularly of Godunov-type schemes. Here we present four related one-dimensional examples of the artifacts caused by this: sub-cell shock position in the stationary shock, the slowly moving shock, the wall heating problem, and the carbuncle phenomenon. Each one of these well known problems is shown to be directly related to the non-linearity of the Hugoniot and numerical experiments are performed to verify the connection. Lastly, a system with a straight Hugoniot is described and shown not to su_er from any of these phenomena.

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