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Unsteady state Rankine-Hugoniot jump conditions YUKIO SANO¹, TOMOKAZU SANO, Osaka University — A theorem of equivalence regarding the discontinuity of the solution \tilde{u} ($\tilde{u}^{(1)}, \tilde{u}^{(2)}, ..., \tilde{u}^{(n)}, \tilde{u}$) of an underdetermined system of n quasi-linear partial differential equations in one spatial dimension is proven. It is also included in the proof that all the thicknesses of the discontinuities of $\tilde{u}^{(i)}$ (i=1,2,...,n+1) are the same. Unsteady state Rankine-Hugoniot (RH) jump conditions are derived from the system through its integration over the thickness. The jump conditions suggest a possibility that the jumps in \tilde{u} evaluated from the conditions can differ significantly from those from the RH jump conditions. The significant differences in evaluation between both jumps are illustrated by demonstrating that infinitely large jumps in the particle velocity and stress across a spherical wave front are caused by an extremely intense explosion.

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