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			authors	• K. Powell	DUPLICATES	1165
	authors	• Kenneth E. Powell	**title**	AN APPROXIMATE RIEMANN SOLVER FOR MAGNETOHYDRODYNAMICS (That Works in More than One Dimension)		
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	urls	• https://openalex.org/W1648756153	**id**	id4668091230024450212		
	id	id-3494123375894148727	**abstract**	An approximate Riemann solver is developed for the governing equations of ideal magnetohydrodynamics (MHD). The Riemann solver has an eight-wave structure, where seven of the waves are those used in previous work on upwind schemes for MHD, and the eighth wave is related to the divergence of the magnetic field. The structure of the eighth wave is not immediately obvious from the governing equations as they are usually written, but arises from a modification of the equations that is presented in this paper. The addition of the eighth wave allows multi-dimensional MHD problems to be solved without the use of staggered grids or a projection scheme, one or the other of which was necessary in previous work on upwind schemes for MHD. A test problem made up of a shock tube with rotated initial conditions is solved to show that the two-dimensional code yields answers consistent with the one-dimensional methods developed previously.		
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