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abstract	We develop a new numerical scheme for ideal magnetohydrodynamic (MHD) simulations, which is robust against one- and multi-dimensional shocks, and is accurate for low Mach number flows and discontinuities. The scheme belongs to a family of the advection upstream splitting method employed in computational aerodynamics, and it splits the inviscid flux in MHD equations into advection, pressure, and magnetic tension parts, and then individually evaluates mass, pressure, and magnetic tension fluxes at the interface of a computational cell. The mass flux is designed to avoid numerical shock instability in multidimension, while preserving contact discontinuity. The pressure flux possesses a proper scaling for low Mach number flows, allowing reliable simulations of nearly incompressible flows. The magnetic tension flux is built to be consistent with the HLLD approximate Riemann solver to preserve rotational discontinuity. We demonstrate various benchmark tests to verify the novel performance of the scheme. Our results indicate that the scheme must be a promising tool to tackle astrophysical systems that include both low and high Mach number flows, as well as magnetic field inhomogeneities.	We develop a new numerical scheme for ideal magnetohydrodynamic (MHD) simulations, which is robust against one- and multidimensional shocks, and is accurate for low Mach number flows and discontinuities. The scheme belongs to a family of the advection upstream splitting method employed in computational aerodynamics, and it splits the inviscid flux in MHD equations into advection, pressure, and magnetic tension parts, and then individually evaluates mass, pressure, and magnetic tension fluxes at the interface of a computational cell. The mass flux is designed to avoid numerical shock instability in multidimensions, while preserving contact discontinuity. The pressure flux possesses a proper scaling for low Mach number flows, allowing reliable simulations of nearly incompressible flows. The magnetic tension flux is built to be consistent with the HLLD approximate Riemann solver to preserve rotational discontinuity. We demonstrate various benchmark tests to verify the novel performance of the scheme. Our results indicate that the scheme must be a promising tool to tackle astrophysical systems that include both low and high Mach number flows, as well as magnetic field inhomogeneities.		
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