cases	doc_1		doc_2		decision	id
	authors	• Ian Holloway • Sivaguru S. Sritharan				
	title	Ideal Magnetohydrodynamic Equations on a Sphere and Elliptic-Hyperbolic Property	**authors**	• Holloway, I. • Sritharan, S.		
	publication_date	2019-10-20 00:00:00	**title**	Ideal magnetohydrodynamic equations on a sphere and elliptic-hyperbolic property		
	source	SupportedSources.INTERNET_ARCHIVE	**publication_date**	None		
	journal		**source**	SupportedSources.UNPAYWALL		
	volume		**journal**	Quarterly of Applied Mathematics		
	doi		**volume**		DUPLICATES	1018
	urls	• https://web.archive.org/web/20200829051530/https://arxiv.org/pdf/1910.10637v1.pdf	**doi**	10.1090/qam/1571		
	id	id602649032262156951	**urls**	• https://doi.org/10.1090/qam/1571		
	abstract	This work contains the derivation and type analysis of the conical Ideal Magnetohydrodynamic equations. The 3D Ideal MHD equations with Powell source terms, subject to the assumption that the solution is conically invariant, are projected onto a unit sphere using tools from tensor calculus. Conical flows provide valuable insight into supersonic and hypersonic flow past bodies, but are simpler to analyze and solve numerically. Previously, work has been done on conical inviscid flows governed by the Euler equations with great success. It is known that some flight regimes involve flows of ionized gases, and thus there is motivation to extend the study of conical flows to the case where the gas is electrically conducting. To the authors' knowledge, the conical magnetohydrodynamic equations have never been derived and so this paper is the first invesitgation of that system. Among the results, we show that conical flows for this case do exist mathematically and that the governing system of partial differential equations is of mixed type. Throughout the domain it can be either hyperbolic or elliptic depending on the solution.	**id**	id-8967118372324268332		
	versions		**abstract**			
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