



Library Indian Institute of Science Education and Research Mohali



DSpace@IISERMohali (/jspui/)

/ Thesis & Dissertation (/jspui/handle/123456789/1)

/ Master of Science (/jspui/handle/123456789/2)

/ MS-12 (/jspui/handle/123456789/723)

Please use this identifier to cite or link to this item: <http://hdl.handle.net/123456789/809>

Title: A Study on Central Simple Algebras

Authors: Guhan, Jayanth (/jspui/browse?type=author&value=Guhan%2C+Jayanth)

Keywords: Mathematics
Algebra
F-algebra

Issue Date: 17-Jul-2017

Publisher: IISER-M

Abstract: The main goal of this thesis is to understand the paper 1 on "Division Algebras of Degree 8 with Involutions" by S. A. Amitsur, J.P. Tignol and L.H. Rowen. To this end we set up the foundations of central simple algebras and explore their properties. We shall discuss the Artin-Wedderburn Theorem, the Skolem-Noether Theorem, and some consequences of the same. Further in, we shall define the Brauer group of a field, and what it means to split a central simple algebra. We shall discuss the existence of Galois splitting fields, and then move on to discuss Brauer Groups of certain fields, concluding with Chevalley's Theorem. For a central simple F -algebra A , the dimension $[A : F]$ is a perfect square, say n^2 . The number n is called the degree of the central simple F -algebra. A central simple F -algebra is defined to be a quaternion algebra, if $n = 2$. An involution (of the first kind) of A is an antiautomorphism of degree 2 fixing F . It can be shown that, any central simple algebra with involution has degree $2m$ for some m . A tensor product of quaternion subalgebras with involutions results in a central simple algebra of degree $2m$, with the natural involution. Conversely, if a central simple F -algebra with an involution has degree $2m$ for some m , can it always be written as a tensor product of quaternion F -algebras? We set up the necessary and sufficient conditions for a central simple F -algebra to have involutions, and to be tensor products of quaternion algebras. We use these conditions on "generic abelian crossed products" to construct a counterexample; a division algebra of degree 8 with involution, which cannot be expressed as the tensor product of quaternion subalgebras.


URI: <http://hdl.handle.net/123456789/809> (<http://hdl.handle.net/123456789/809>)

Appears in MS-12 (/jspui/handle/123456789/723)
Collections:

Files in This Item:

File	Description	Size	Format	
MS-12104.pdf (/jspui/bitstream/123456789/809/1/MS-12104.pdf)		732.13 kB	Adobe PDF	View/Open (/jspui/bitstream/123456789/809/1/MS-12104.pdf)

[Show full item record \(/jspui/handle/123456789/809?mode=full\)](/jspui/handle/123456789/809?mode=full)

 [\(/jspui/handle/123456789/809/statistics\)](/jspui/handle/123456789/809/statistics)

Items in DSpace are protected by copyright, with all rights reserved, unless otherwise indicated.