



IMS September Meeting 2007 Seminar

Title: A multivariable Cayley–Hamilton theorem

Speaker: M. Mathieu

Date: Tue 4th September 2007 at 4:00PM

Location: ENG226

Abstract: The Weyl calculus for a pair $A = (A_1, A_2)$ of selfadjoint $n \times n$ matrices, due to H. Weyl, associates a matrix $W_A(f)$ to each smooth function f defined on $\mathbb{R}^2$ in a linear but typically not multiplicative way. Letting $c_A(x) = \det((A_1 - x_1)^2 + (A_2 - x_2)^2)$ for $x = (x_1, x_2) \in \mathbb{R}^2$ denote the joint characteristic polynomial of the pair A it is known, for $n \geq 3$, that $A_1 A_2 = A_2 A_1$ if and only if $W_A(c_A) = 0$. It is an open problem whether this is still true for $n \geq 3$. We shall discuss two new approaches to this problem: the role of the canonical order structure for selfadjoint matrices; and topological invariants arising from continuity properties of the non-linear map $(f, A) \mapsto W_A(f)$. This is joint work with W. Ricker, Eichstätt, Germany to be published in Math. Proc. Royal Ir. Acad.

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