Yuri Berest, Cornell University

Algebraic Geometry of Differential Operators

In 1912, Jacques Hadamard conjectured that among all second order hyperbolic operators only the classical D'Alembertians in even dimensions \( n > 2 \) satisfy Huygens' Principle. Although Hadamard's conjecture turned out to be false (the first counterexamples were found in 1953), it led Petrovsky and later Atiyah, Bott, Gårding to develop a beautiful theory of lacunas for higher order hyperbolic operators with constant coefficients. However, the problem of lacunas for differential operators with variable coefficients is still open, even in the original case of second order wave operators.

In this talk, after describing some history and earlier results, I will explain how Hadamard's problem can be translated into the language of algebraic geometry (in fact, noncommutative algebraic geometry) and linked to another famous problem — the Serre problem for rings of differential operators on algebraic varieties. The talk should be accessible to graduate students.

Thursday, October 28, 2010
at 4:25 PM in 406 Malott Hall

Refreshments will be served at 3:55 PM in the Mathematics Department lounge (532 Malott Hall).