Frobenius and Differential Operators to Measure Singularities

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In 1969, Kunz showed that the Frobenius map can be used to detect whether a variety is smooth or singular. Since then, this map has played a central role in the classification and measurement of singularities in prime characteristic. In this talk, we focus on the F-pure threshold, a numerical invariant introduced by Takagi and Watanabe that quantifies the extent to which the Frobenius map splits. We will discuss geometric properties of this invariant and their relation to differential operators. This is joint work with Alessandro De Stefani (Università di Genova) and Ilya Smirnov (Basque Center for Applied Mathematics).

In Special Invited Talks at the Mathematical Congress of the Americas 2025.

MCA 2025 internal code: Invited12