

Invariants of singularities and the geometry of arc spaces

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Abstract: Since their introduction into algebraic geometry by J. Nash, arc spaces and jet schemes have been used to analyze and control invariants of singularities of algebraic varieties. Traditionally this is done by studying the topological structure of arc spaces. For example, understanding containments between closed subsets of arc spaces allows us to control classical invariants like discrepancies and log canonical thresholds. But recent developments suggest that the geometric structure of arc spaces (their singularities, their non-reduced structure) should also play an important role. For instance, embedding dimensions and codimensions in arc spaces are directly related to Mather and Mather-Jacobian discrepancies. In collaboration with C. Chiu and T. de Fernex, we have been developing a toolbox for the study of the schematic structure of arc spaces and jet schemes. In this talk I will give an overview of the latest developments in this area.