

Fourth order curvature flows and geometric applications

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In this talk, we present a proof of a rigidity result for compact four manifolds that is entirely based on a geometric flow. To achieve this goal, we study the gradient flows of a number of quadratic curvature functionals on four manifolds. We show that if the flow starts with a metric of positive Yamabe constant and if we assume an explicit bound on the initial energy, then no singularity can occur. Under those assumptions, the flow exists for all time, and converges up to a subsequence to a quotient of the sphere. It gives an alternative proof, under stronger assumptions, of a theorem of Chang, Gursky and Yang asserting that integral pinched four manifolds with positive Yamabe constant are space forms.