

Optimal Metrics on 4-Manifolds

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Dedicated to 60th birthday of Sylvestre Gallot

This lecture will discuss the problem of determining which smooth compact 4-manifolds admit Riemannian metrics that minimize the L2-norm of the curvature tensor. Einstein metrics and scalar-flat anti-self-dual metrics provide us with two interesting classes of examples. The talk will describe some recent existence and non-existence theorems for such metrics. As it turns out, the difference between existence and non-existence depends rather delicately on the differentiable structure, and is not determined by the homeotype alone.