AMATH 507

CALCULUS OF VARIATIONS

The Department of Applied Mathematics is offering a winter course in the calculus of variations. The calculus of variations is a branch of optimization theory. It seeks to find curves and surfaces that maximize or minimize integrals.

I will cover the Euler–Lagrange equation, constraints, the second variation, the Legendre condition, the Jacobi equation, transversality conditions, broken extremals, the Weierstrass excess function, sufficient conditions, the royal road, and Hamilton–Jacobi theory.

Examples will include the brachistochrone, minimum surfaces of revolution (soap films), geodesics, and numerous applications from classical mechanics, optics, and other areas.

Winter 2017. 5 credits.
M, W, F 10:30-11:20, Loew 216
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