

# Exterior differential systems on Lie algebroids

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**16:00-17:00h on campus in M.G.004**  
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In this talk, we extend the theory of *Exterior Differential Systems* (EDS) from manifolds to Lie algebroids. EDS is a geometric tool which can be used to prove the existence of (local) solutions to systems of PDEs. Indeed, computing so-called *integral manifolds* of an EDS is equivalent to computing local solutions.

We will also discuss the main motivation behind this extension. EDS on manifolds has been used successfully to solve certain cases of the *inverse problem of the calculus of variations*. However, as far as we know, it cannot be used to solve the following modification of this problem: Given a  $G$ -invariant second-order system on a Lie group  $G$ , when does there exist a  $G$ -invariant Lagrangian whose Euler–Lagrange equations are equivalent to this system? We find that developing the theory of EDS on Lie algebroids is natural to study this problem.

This is joint work with Tom Mestdag and Sonja Hohloch.