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## Lagrangian Mechanics on Supermanifolds

### Abstract

Classical — or really quasi-classical — theories that include fermions such as the electron require anticommuting degrees of freedom, and so we encounter supermanifolds. The idea of quasi-classical mechanics as Grassmann algebra valued mechanics has been developed since the 1970s. However, there are some unnatural choices to be made and some subtle issues that have in my opinion not been addressed properly before. In this talk I will present an overview of Lagrangian mechanics on supermanifolds by modifying the geometric ideas of Tulczyjew. In order to do this we will need the categorical approach to supermanifolds, i.e., the functor of points and internal Homs. In particular we will understand the phase dynamics as an implicit differential equation and solutions thereof are 'S-curves' which are time parameterised functors from the opposite category of supermanifolds to the category of sets.