1116-34-1374 **Vishal Vasan*** (`vishal.vasan@icts.res.in`), International Centre for Theoretical Sciences, TIFR Centre Building, IISc Campus, Subedarpalya, Malleshwaram, Bangalore, Karnataka 560012, India. *Gradient descent with nonlinear constraints: a dynamical systems approach.* Preliminary report.

One of the oldest and simplest algorithms for smooth optimisation problems is gradient descent. Our goal is to develop a method for constrained optimisation that follows the original spirit of unconstrained gradient descent, i.e. simply following a vector field pointing towards the optimal point. In this setup we view nonlinear constraints as defining a manifold and hence we construct a vector field that exhibits first integrals of motion which are precisely the constraints and simultaneously minimises the cost function. This is achieved by using a generalisation of Hamiltonian dynamical systems. This talk will present some preliminary work in this direction. (Received September 19, 2015)