1124-49-113 **Cristopher Hermosillo** and **Peter R Wolenski*** (wolenski@math.lsu.edu), Department of Mathematics, Louisiana State University, Baton Rouge, LA 70806. *Fully convex control problems with state constraints and impulses.* Preliminary report.

A Fully Convex Control (FCC) problem has the appearance of the classical calculus of variations Bolza problem

$$\min \int_0^T L(x(t), \dot{x}(t))dt + \ell(x(0), x(T)),$$

where the minimization is over $x(\cdot)$ belonging to some class of arcs. The distinguishing features of FCC are that the data $L$ and $\ell$ (i) may take on the value $+\infty$ and (ii) are convex functions. Allowance of (i) provides great flexibility incorporating constraints so that most standard control problems come under its purlieu. However, broad generality is restrained by (ii), but includes the classical linear quadratic regulator and many of its generalizations. The speciality of (ii) opens up the possibility of using convex dual formulations.

We review the Hamilton-Jacobi (HJ) theory for FCC problems when the data is finite and coercive, in which case the minimizing class of arcs are absolutely continuous. A natural extension is to allow for state constraints and impulsive arcs. We shall describe how to approximate these utilizing Goebel's self-dual envelope. The approximate problems maintain duality and the existing theory can be applied to them. It is proposed that an HJ theory can be developed as an appropriate limit of the approximating problems. An explicit example will illustrate this. (Received September 02, 2016)