

# First Joint Meeting Brazil Italy of Mathematics Special Session: Control and Asymptotics of Nonlinear PDE Dynamics

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**Title:** State constrained control problems in infinite dimension

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**Abstract:** In this talk some new results on state constrained differential inclusions of the type

$$\dot{x}(t) \in Ax(t) + F(t, x(t)), \quad (1)$$

with  $x(t) \in K$ , are discussed. The setting is quite general, hence our analysis applies to some interesting and delicate frameworks: the operator  $A$  is the infinitesimal generator of a strongly continuous semigroup  $S(t) : X \rightarrow X$ , and  $X$  is an infinite dimensional separable Banach space. Assuming an *inward pointing condition* on the state constraint  $K$  (allowed to be nonsmooth), we prove neighboring feasible trajectories theorems, in order to approximate trajectories of (1) by trajectories lying in the interior of  $K$ . Applications of these abstract results on regularity of the value function associated to control problems, variational inclusions, non degeneracy of first order necessary condition for the optimality, are provided. Some control problems involving PDEs are presented as well.