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Relaxation theorem for state constrained differential inclusions in infinite dimension

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We consider the semilinear differential inclusion $x' \in Ax + F(t,x)$, under state constraints of the form $x(t) \in K$. Here A is the infinitesimal generator of a strongly continuous semigroup on a separable Banach space X, $F : [0,1] \times X \to X$ is a set-valued map and K is a closed subset of X. We provide sufficient conditions for a relaxation result stating that the set of trajectories lying in the interior of K is dense in the set of feasible solutions of the convexified inclusion $x' \in Ax + \overline{co}F(t,x)$. Some applications to control problems involving PDEs are presented.