Infinite-dimensional input-to-state stability

Abstract

In this talk we discuss infinite-dimensional versions of well-known stability notions relating the external input $u$ and the state $x$ of a linear system governed by the equation

$$\dot{x} = Ax + Bu, \quad x(0) = x_0.$$ 

Here, $A$ and $B$ are unbounded operators. For instance, the system is called $L^p$-input-to-state stable if

$$u(\cdot) \mapsto x(t)$$

is bounded as a mapping from $L^p(0,t)$ to the state space $X$ for all $t > 0$. In particular, we elaborate on the relation of this notion to integral input-to-state stability and (zero-class) admissibility with a special focus on the case $p = \infty$. This is joint work with B. Jacob, R. Nabiullin and J.R. Partington.