

## On asymptotic growth of solutions of $C_0$ semigroups

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We consider linear differential equation

$$\dot{x}(t) = Ax(t), \quad x(t) \in D(A) \subset X,$$

where  $A : D(A) \rightarrow X$  is a closed (usually unbounded) operator generating  $C_0$  semigroup  $\{T(t)\}_{t \geq 0}$  on Banach space  $X$ . The talk is devoted to some aspects of stability of the semigroup  $T(t)$  and corresponding solutions  $T(t)x$ . We discuss some spectral conditions of asymptotic stability and present the generalizations of stability concept: polynomial stability and the existence of the fastest growing solution - so called maximal asymptotics. In particular we present our results in the field of asymptotic behaviour of strongly continuous semigroups: theorem on the sufficient condition for polynomial stability and theorem on non existence of maximal asymptotics for some types of semigroups acting on a Banach space.

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