Realizable growth vectors and normalization of homogeneous
approximations of affine control systems
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In my talk, I will discuss some problems arising in connection with the study of homogeneous approximations of control systems.

More precisely, we consider affine control systems $\dot{x} = \sum_{i=1}^{m} u_i X_i(x)$, where $X_i(x)$ are real analytic in a neighborhood of the origin. The object under consideration is a *growth vector* (at the origin) of such system. *The first ("realizability") problem* is: for a given sequence $v = (v_1, \ldots, v_p)$, to determine if there exists a system having the growth vector v.

Obviously, if two systems have the same homogeneous approximation then they have the same growth vector. Thus, *the second problem* is: for a given growth vector v, to describe all possible homogeneous approximations of systems with this growth vector.

Observe that (nonsingular) changes of the control can change the homogeneous approximation (however, they cannot change the growth vector). Hence, *the third problem* is: for a given growth vector, to normalize (if it is possible) homogeneous approximations using changes of the control, and to describe all possible normal forms.

The lecture is based on a joint work with A.Agrachev.