This paper addresses the problem of normal local stabilization for nonlinear control systems of the form
\[ \dot{x} = f(x, u), \quad x \in \mathbb{R}^n, \quad u \in \mathbb{R}^m. \]

The above system is called normally locally stabilizable at a point \( P \in \mathbb{R}^n \) if, for each \( \tau > 0 \), there exists a neighborhood \( D \) of \( P \) such that any point \( x \in D \) can be steered by a piecewise constant control to an arbitrary neighborhood of \( P \) in time less than \( \tau \) and remains there. The author shows the following sufficient condition for solvability of this problem: there exist control values \( u_1, u_2, \ldots, u_{n+1} \) such that any \( x \in \mathbb{R}^n \) is represented as \( x = \sum_{i=1}^{n+1} \lambda_i f_i(0, u_i) \) with some nonnegative \( \lambda_i \). Then a solution to the normal local stabilization is proposed based on a construction of contracting cylinders.

Reviewer: Alexander Zuyev (Magdeburg)

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References:

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