REDUCTION PRINCIPLE IN THE THEORY OF STABILITY FOR HOMOGENEOUS DIFFERENTIAL EQUATIONS[1]

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Consider the following system of differential equations in small neighbourhood of origin in $\mathbb{R}^{n+k}$

$$\begin{cases} \dot{x} &= X(x,y), \\ \dot{y} &= Y_m(x,y) + g(x,y), \end{cases} \tag{1}$$

where $Y_m(\lambda y) = \lambda Y_m(y)$ $(\lambda \geq 0, m > 1)$, $X(x,y) = o((|x| + |y|)^m)$ and $g(x,y) = o((|x| + |y|)^m)$. We find sufficient conditions of the existence Lipschitzian map u in small neighbourhood of origin that the trivial solution of

$$\dot{x} = X(x, u(x)))$$

is stable, asymptotically stable or nonstable if and only if the trivial solution of difference equation (1) is stable, asymptotically stable or nonstable.

REFERENCES

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