

From a Controllable and Observable Linear Dynamical System to a Uncontrollable and/or Unobservable one

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ABSTRACT

Let (A, B, C) be a triple of matrices representing a time-invariant linear system

$$\begin{cases} \dot{x}(t) = Ax(t) + Bu(t) \\ y(t) = Cx(t) \end{cases}$$

under basis change in the state space equivalence.

In this paper we measure the distance between a controllable and observable triple of matrices (A, B, C) and the nearest non controllable or non observable one. An upper bound is obtained in terms of a singular values of the controllability, observability and controllability and observability matrices.

Also a geometrical study of the orbits of the equivalent triples is given.

References

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