**Q1:**

A stabilizable system will reach the desired state for a control input . If the a system is not stabilizable no minimum of the LQR problem can be found since the state cost will increase continuously.

A reachability test could be performed since a reachable system is also stabilizable. Reachability is a necessary condition for stabilizability. Therefore, the full rank of the controllability Matrix or the PBH test is to be checked.

The PBH test for reachability is performed: A system (A, B) is unreachable if and only if there exists a left hand eigenvector with such that

and .

The calculation delivers the following eigenvalues:

As a result, the system is reachable and since the reasoning above it’s also stabilizable.

**Q2:**

Ein Bild, das Text, Reihe, Diagramm, parallel enthält.

Automatisch generierte Beschreibung

By multiplying the R matrix by factor 10