

**Some observations on the common quadratic Lyapunov function question.**

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**Abstract:**

The question of the existence of a common quadratic Lyapunov function (CQLF) for a set of stable matrices is approached from a geometrical point of view. The non-existence of a CQLF is shown to be equivalent to the intersection of certain cones in the space of matrices. This observation leads to an algebraic condition for non-existence, which can be expressed as the singularity of a block matrix composed out of the stable matrices. Simplifications occur in some special cases, in particular for dimensions two and three, and these will be explained in detail. This work is part of a joint project with Bob Shorten.