

Some Geometry for Robot Kinematics

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Abstract

The talk will begin with a brief review of dual quaternions and the realisation of the group of rigid-body displacements by the Study quadric. Next we look at some linear subspaces of the Study quadric and their interpretation as sets of displacements. Following this we will describe some sets of displacements that are intersections of the Study quadric with linear subspaces of the surrounding \mathbb{P}^7 . Then we will discuss some Segre varieties. These can be realised by simple serial linkages.

A final extended example shows how some of these ideas can be used to solve problems in the theory of mechanisms.