Properties of Reachability and Almost Reachability Sub-spaces of Implicit Systems: the Extension Problem

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Abstract: A geometric characterisation of the reachability subspaces and almost reachability subspaces of implicit systems of the type $S(F,G) : F\dot{x} = Gx$ is given. Furthermore a classification of the almost reachability subspaces of such systems, based on the property that almost reachability spaces, or subspaces of such spaces can be extended to reachability spaces, is presented. In addition, necessary and sufficient conditions have been given for the above properties to hold true. The property of extension of a certain type of subspace to another type is integral part of the study of generalised dynamic cover problems of geometric theory.