Controllability of Retarded Dynamical Systems

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Abstract: In the paper linear abstract retarded dynamical systems defined in infinite-dimensional Hilbert spaces are considered. Using frequency-domain methods and spectral analysis for linear selfadjoint operators necessary and sufficient conditions for approximate relative controllability are formulated and proved. The method presented in the paper allows to verify approximate relative controllability for abstract retarded dynamical systems by consideration approximate controllability of suitable simplified abstract dynamical systems without delays. Moreover, as an illustrative example approximate relative controllability of retarded distributed parameter dynamical system is investigated. Presented results extend to more general class of retarded dynamical systems controllability theorems known in the literature.