

## Continuous-Time Input-Output Decoupling for Sampled-Data Systems.

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*Abstract:* The problem of obtaining a continuous-time (i. e., ripple-free) input-output decoupled control system for a continuous-time linear time-invariant plant, by means of a purely discrete-time compensator, is stated and solved in the case of a unity feedback control system. Such a control system is hybrid, since the plant is continuous-time and the compensator is discrete-time. A necessary and sufficient condition for the existence of a solution of such a problem is given, which reduces the mentioned hybrid control problem to an equivalent purely continuous-time decoupling problem. A simple necessary and sufficient condition for the existence of a solution of such a continuous-time decoupling problem is given for square plants (with and without the additional requirement of the asymptotic stability of the over-all control system), together with a parameterisation of all the decoupling controllers. Moreover, for square plants, it is shown that, whenever the hybrid control problem admits a solution, any solution of the corresponding decoupling problem for the discrete-time model of the given continuous-time system is also a solution of the hybrid control problem.

*Keywords:*

*AMS Subject Classification:* 93B;