

A Unifying Point of View on Designs of Output Feedback

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Abstract:

Design of output feedback for non linear systems is a difficult topic which has attracted attention of researchers with very different point of views. We intent to unify all these contributions with as ultimate goals:

- making easier to teach this intricate topic,
- getting a better grasp and allowing a better evaluation,
- identifying holes and trying to fill them up as well as finding new routes.

For this, we start with a necessary condition on the structure of Lyapunov functions for the closed loop systems. This leads to distinguish two classes of designs:

- the direct approach also called control error model
- the indirect approach also called dynamic error model

and within these two classes, two sub-classes:

- domination
- cancellation

We show how most of what has been published on this topic can be reinterpreted along these lines.

About the Speaker:

Laurent Praly graduated from École Nationale Supérieure des Mines de Paris in 1976. After working in industry for three years, in 1980 he joined the Centre Automatique et Systèmes at École des Mines de Paris. From July 1984 to June 1985, he spent a sabbatical year as a visiting assistant professor in the Department of Electrical and Computer Engineering at the University of Illinois at Urbana-Champaign. Since 1985 he has continued at the Centre Automatique et Systèmes where he served as director for two years. In 1993, he spent a quarter at the Institute for Mathematics and its Applications at the University of Minnesota where he was an invited researcher. His main interest is in feedback stabilization of controlled dynamical systems under various aspects -- linear and nonlinear, dynamic, output, under constraints, with parametric or dynamic uncertainty --. On these topics he is contributing both on the theoretical aspect with many academic publications and the practical aspect with applications in power systems, mechanical systems, aerodynamical and space vehicles.
