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A Decentralized Stabilization Approach of a Class of Nonlinear Polynomial Interconnected Systems Application for a Large Scale Power System

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Abstract: This paper presents a new approach dealing with the decentralized control of non linear interconnected systems. The key of this work is, on one hand, the description of the nonlinear systems using the Kronecker product notations which allow important manipulations, and on the other hand the use of the Lyapunov's direct method of stability analysis, associated with a quadratic function. The proposed approach is then applied to an industrial process: a three-machine-based interconnected power system, to improve its decentralized stabilization.

Keywords: *nonlinear systems; interconnected systems; decentralized stabilization; Kronecker product; power systems.*

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1 Introduction

In recent years, modern control methods have found their way into decentralized design of interconnected large scale nonlinear systems, leading to a wide variety of new concepts and results ([2]- [4], [18], [23]).

Decentralized control aims mainly to carry out a feedback control for each subsystem using only its local state variables.

The decentralized control law implementation is more feasible and more economical than a centralized control being dependant on the whole state variables for each subsystem local control. This kind of control is very important for the power systems which

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