Backstepping for Nonsmooth MIMO Nonlinear Volterra Systems with Noninvertible Input-Output Maps and Controllability of Their Large Scale Interconnections ◇

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Abstract: We prove the global controllability for a class of nonlinear MIMO Volterra systems of the triangular form as well as for their bounded perturbations. In contrast to the related preceeding work [15], we replace the condition of C^1 smoothness, which was essentially used before, with that of local Lipschitzness. Furthermore, we remove the assumption of the invertibility of the input-output interconnections, which was also essential in these preceeding results. In order to solve the problem, we revise the backstepping procedure proposed in these works, and combine it with another method of constructing discontinuous feedbacks proposed for the so-called "generalized triangular form" in the case of ODE [16, 21].

Keywords: *backstepping; Volterra nonlinear control systems; controllability, large scale systems.*

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