

Chapter 3

Nonlinear Systems Theory

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In this chapter, we introduce the machinery of differential geometry and related concepts as analysis tools for nonlinear process control systems. This chapter will also serve as background for the nonlinear controller synthesis material that is discussed in Chapter 5. There are several texts and review articles which pursue the details of the differential geometric approach in greater depth than is presented here. Notable are the texts by Isidori [18] and Nijmeijer and Van der Schaft [25]. In the process control area, there is a thorough treatment of the material in the tutorial article by Kravaris and Kantor [21]; in addition, there is a good overview of general nonlinear approaches to process control system design by Bequette [1].

