The objective of this textbook is to acquire an understanding of the behaviour of fuzzy logic controllers. Under certain conditions a fuzzy controller is equivalent to a proportional-integral-derivative (PID) controller. Using that equivalence as a link, the book applies analysis methods from linear and nonlinear control theory. In the linear domain, PID tuning methods and stability analyses are transferred to linear fuzzy controllers. The Nyquist plot shows the robustness of different settings of the fuzzy gain parameters. As a result, a fuzzy controller is guaranteed to perform as well as any PID controller. In the nonlinear domain, the stability of four standard control surfaces is analysed by means of describing functions and Nyquist plots. The self-organizing controller (SOC) is shown to be a model reference adaptive controller. There is a possibility that a nonlinear fuzzy PID controller performs better than a linear PID controller, but no guarantee. The conclusion is that even though fuzzy control is mostly nonlinear, and commonly based on a trial-and-error design approach, control theory does provide tools for analysing the behaviour of fuzzy control systems. Further studies are required, however, to find methods for designing fuzzy control systems, such that these exhibit a particular behaviour in accordance with a set of performance specifications.