

Part II

Stability Analysis Techniques

Stability analysis is an essential issue in control systems. Lyapunov stability theory provides a basic mathematical tool to conduct stability analysis for PFMB control systems. From Chaps. 3–5, effective and systematic techniques using symbolic variables, information of membership functions, approximated membership functions, and slack matrices are proposed to obtain relaxed MFD stability conditions in SOS-based stability analysis. The SOS-based MFD stability conditions offers a fundamental tool for the design of stable polynomial controllers and provides a concrete theoretical background to support the development of control methodologies using the PFMB control concept.