This PART is specially prepared to provide readers with the necessary background to enable them to go through this book with the least difficulty. However, it would also be very beneficial for readers to refer to Chaps. 2–6 in Chang (2003, 2013a) for other fundamentals in hyperspectral imaging.

Chapter 2: Linear Spectral Mixture Analysis (LSMA) has been well-studied in hyperspectral data exploitation. One of its primary applications is linear spectral unmixing which assumes that data sample vectors can be described by a linear mixture model from which data sample vectors can be unmixed into their corresponding abundance fractions.

Chapter 3: Finding Endmembers in Hyperspectral Imagery is a fundamental task which has received considerable interest in recent years. It is different from endmember extraction which must assume the presence of endmembers in the data. Instead, endmember finding is to find potential endmember candidates directly from the data to be processed, which may or may not be true endmembers.

Chapter 4: Linear Spectral Unmixing with Three Criteria, Least Squares Error (LSE), Simplex Volume (SV) and Orthogonal Projection (OP) explores close connections in these three design rationales.

Chapter 5: Hyperspectral Target Detection is one of major strengths involved with hyperspectral imaging. It can be performed in two different aspects, active target detection and passive target detection according to how information is used and can be considered as a priori and a posteriori approaches.