

5	Geometric Constructions for Colour Vision	119
5.1	Introduction	119
5.2	Object Colours	121
5.3	The Spectrum Locus	122
5.4	The Spectrum Cone	125
5.5	Chromaticity	128
5.5.1	Shadow Series	129
5.5.2	Chromaticity Coordinates	130
5.5.3	The Chromaticity Diagram	132
5.5.4	Interpretation of Chromaticity	133
5.6	Object-Colour Solids	135
5.7	The Shape of Object-Colour Solids at the Origin	139
5.8	Optimal Colours	144
5.8.1	Reflectance Spectra in Schrödinger Form	145
5.8.2	The Optimal Colour Theorem	147
5.8.3	Constructing Optimal Colours	149
5.8.4	Non-Metamerism of Optimal Colours	152
5.9	Chapter Summary	154
6	Computational Colour Constancy	157
6.1	Introduction	157
6.2	Geometric Constructions for Artificial Sensors	160
6.2.1	Sensor Response Functions	161
6.2.2	The Sensor Spectrum Locus	164
6.2.3	The Sensor Spectrum Cone	166
6.2.4	The Sensor Chromaticity Diagram	168
6.2.5	Illuminant Gamuts of a Sensing Device	171
6.2.6	The Shape of Illuminant Gamuts at the Origin	174
6.2.7	Summary	176
6.3	Gamut-Based Illuminant Estimation	177
6.3.1	Colour Correction and Illuminant Estimation	177
6.3.2	The Image Gamut	178
6.3.3	GBIE Implementation	179
6.3.4	Applications of Geometry to GBIE	180
6.4	Metamer Mismatch Bodies	183
6.4.1	Problem Description	183
6.4.2	Perfect Colour Conversion between Sensors	184
6.4.3	Metamer Sets and Functionals	187
6.4.4	Constraints for a Metamer Mismatch Body	189
6.5	Chapter Summary	192