

# CONTENTS

<i>Preface</i>	<i>vii</i>
<i>Future Contributions</i>	<i>ix</i>
<i>Acknowledgments</i>	<i>xiii</i>
<i>Foreword: Short History of the LIP Model</i>	<i>xv</i>
<i>Main Notations</i>	<i>xxi</i>
<b>1. Gray-Level LIP Model. Notations, Recalls, and First Applications</b>	<b>1</b>
1. Basic Notations	1
2. Definition of Logarithmic Laws on the Space of Images	3
3. First Consequences of the Vector Space Structure	10
4. About a Good Use of the LIP Model	21
5. Transition to Next Chapters	25
Acknowledgment	25
References	25
<b>2. Various Contrast Concepts</b>	<b>27</b>
1. Logarithmic Additive Contrast	29
2. Logarithmic Multiplicative Contrast	45
3. What About Color Images?	52
4. Conclusion	59
References	59
<b>3. Metrics Based on Logarithmic Laws</b>	<b>61</b>
1. Introduction	62
2. Recalls on Some Existing Metrics	62
3. Two Ways to Introduce Novel Metrics in the LIP Framework	69
4. The Multiplicative Asplünd's Metric $d_{A_s}^{\Delta}$	78
5. The Additive Asplünd's Metric $d_{A_s}^{\Delta}$	88
6. Examples of Metrics for Color Images	102
7. Other Notions Around Metrics	107
8. Conclusion and Perspectives	111
References	113
<b>4. Dynamic Range Expansion, Night Vision. Stabilization, Centering. Industrial and Biomedical Applications</b>	<b>115</b>
1. A "Killer" Property of the LIP Model: Negative Gray Levels and Negative Thickness of an Object May Be Interpreted as Light Intensifiers	117
2. Low-Light Images Enhancement Through LIP Scalar Multiplication	120

3. Low-Light Images Enhancement Based on LIP Subtraction	134
4. Stabilization and Centering	142
5. Applications	146
6. Local Lighting Correction	155
7. Comparison of LIP Enhancement with Existing Methods	158
8. Conclusion and Perspectives	161
References	162

5. Ability of the LIP Model to Simulate Variable Acquisition Conditions

165

1. Lighting Variations: Source Intensity Variations	166
2. Exposure Time Variation	166
3. Variable Diaphragm Aperture	177
4. Other Simulations	180
5. High Dynamic Range Images	183
6. Conclusion	184
References	184

6. Transfer of Classical Tools to the LIP Context

185

1. Application to Segmentation Methods	186
2. Logarithmic Wavelets	226
3. Percolation	229
4. LIP Top-Hat	239
5. Funnel-Shaped Growing in the Sense of Darsonville	239
6. Application to Semitransparent Media Acquired in Reflection	241
7. Conclusion	241
References	242

7. General Conclusion

245

<i>Index</i>	247
<i>Contents of Volumes 151–194</i>	253