

# Contents

<b>1</b>	<b>Introduction</b>	<b>7</b>
<b>2</b>	<b>Elements of general system's theory</b>	<b>10</b>
<b>3</b>	<b>Entropy</b>	<b>15</b>
3.1	Entropy as a measure of uncertainty . . . . .	16
3.2	The concept of entropy in thermodynamics and statistical physics . . . . .	24
<b>4</b>	<b>The Shannon-like entropic uncertainty measures</b>	<b>28</b>
<b>5</b>	<b>The change of entropy at an infinitesimal change of probability distribution</b>	<b>34</b>
<b>6</b>	<b>Information</b>	<b>39</b>
<b>7</b>	<b>Measures of the configurational organization</b>	<b>43</b>
7.1	The configurational organization of Ising system . . . . .	45
<b>8</b>	<b>The Principle of Maximum Entropy</b>	<b>48</b>
8.1	The maximizing procedure . . . . .	53
8.2	Examples . . . . .	55
8.3	The "inverse" problem . . . . .	60
<b>9</b>	<b>Goal-directed systems</b>	<b>64</b>
9.1	Cooperative interaction in a goal-directed system . . . . .	66

<b>10 Maxwell's device</b>	<b>70</b>
10.1 Maxwell's device as simple cognitive robot . . . . .	72
<b>11 The goal-directed string systems</b>	<b>76</b>
<b>12 Some examples of the functional organized systems</b>	<b>79</b>
12.1 Living objects . . . . .	80
12.1.1 Functional isomorphism of two systems . . . . .	80
12.1.2 Signals as carriers of information . . . . .	81
12.2 Language . . . . .	84
12.3 Music as a functionally organized system . . . . .	87
12.4 Biogenesis . . . . .	87
<b>13 The problem with the goal-directedness</b>	<b>91</b>
<b>14 Epilogue</b>	<b>96</b>
<b>15 Personal notes</b>	<b>106</b>