

• pp. 14: Figure 1.5: the correct figure is reproduced below.





Figure 1.5 A collection of generic information granules forming the vocabulary and their use in the problem description. Environmental conditions X result in some interval of possible values

(a). In the sequel, this gives rise to the concept of a rough set with the roughness of the description being captured by the lower and upper bounds (approximations) as illustrated in (b)

- pp 31: fourth line from top, replace $\{x, A(x)\}$ by $\{A(x), x\}$. Sixth line from top: replace $x = \{0, 1, 2, ..., 10\}$ by $\mathbf{X} = \{0, 1, 2, ..., 10\}$.
- pp 56: expression 3.23, replace the denominator by Card(A_{α_i}).
- pp 69: in example 4.1, replace $[\Omega = 0, 2\pi]$ by $\Omega = [0, 2\pi]$.
- pp 74: expression (4.4), first line, add sub index 1 to $\mu(1)$.
- pp79: sixth line below expression (4.8), replace index *n* by *j* in $r_{ik}r_{kn}$.
- pp 94: expression (4.29) should read as

$$\sum_{x_k \in [a_1, a_2]} A_2(x_k) = \sum_{x_k \in [a_1, a_2]} (1 - A_1(x_k)) = \sum_{x_k \in [a_1, a_2]} - \sum_{x_k \in [a_1, a_2]} A_1(x_k) = N_2 - \frac{N}{2(c-1)} = N_2'$$

- pp 102: the symbol in the subfigure on the right of Figure 5.1 should be \cap instead of \cup .
- pp110: Figure 5.8, the correct figure is depicted below



• pp 111: Figure 5.9, the correct picture is as follows



- pp 115: 8th line from the top, replace "Lukasiewicz t-norm" by "Lukasiewicz s-norm".
- pp 115: delete the last parenthesis of expression (5.14). The last expression should be $a + b - ab = f^{-1}[f(1) \wedge (f(a) + f(b))].$
- pp 116: expression (5.15) should be $a s_g b = g^{-1} (g(a)g(b))$
- pp116: Figure 5.13, replace asb in the *x* axis by $a s_f b$.
- pp 116: Figure 5.14, replace *asb* in the *x* axis by $a s_g b$.

• pp 125: the last expressions should read as follows

$$a u_w b = \begin{cases} 0 & \text{if } 0 \le a, b < e \\ \max(a, b) & \text{if } e \le a, b \le 1 \\ \min(a, b) & \text{otherwise} \end{cases}$$

$$au_{s}b = \begin{cases} \min(a,b) & \text{if } 0 \le a, b \le e \\ 1 & \text{if } e < a, b \le 1 \\ \max(a,b) & \text{otherwise} \end{cases}$$

• pp 127: second line of the first paragraph, the definitions of t_1 and t_2 should be

$$\iota_1 = \{] \alpha_k, \beta_k [\in \iota \mid \beta_k \leq e \}, \ \iota_2 = \{] \alpha_k, \beta_k [\in \iota \mid \alpha_k \geq e \}.$$

- pp 127: first line of the second paragraph replace "conjunctive" by "disjunctive".
- pp 132: replace $h(x_1) \ge h(x_2) \ge \dots h(x_n)$ by $h(x_1) \ge h(x_2) \ge \dots \ge h(x_n)$.
- pp 136: replace (Kelman and Yoga, 1995) by (Kelman and Yager, 1995)
- pp 136: exercise 3, the last expression should read $a \ s \ b = 1 (1 a) \ t \ (1 b)$.
- pp 144: in section 6.4.4, replace $R^{T}(y,x) = P(x,y)$ by $R^{T}(y,x) = R(x,y)$.
- pp 145: in section 6.5.2 we should have

$$R_{\mathbf{X}}(x_i, x_j, ..., x_k) = \Pr oj_{\mathbf{X}} R(x_1, x_2, ..., x_n) = \sup_{x_i, x_u, ..., x_v} R(x_1, x_2, ..., x_n)$$

• pp 145: also, in the last two expressions of section 6.5.2 should be

$$R_{\mathbf{X}}(x) = \Pr oj_{\mathbf{X}}R(x, y) = \sup_{y} R(x, y)$$

$$R_{\mathbf{Y}}(y) = \Pr oj_{\mathbf{Y}}R(x, y) = \sup_{y} R(x, y)$$

• pp 149: all sub-indexes of the projection operator Proj should be bold. For instance, the first expression should be

 $\operatorname{Proj}_{\mathbf{X}}R \times \operatorname{Proj}_{\mathbf{Y}}R \supseteq R$

• pp 150: in item (b) we should have $\forall (x,y) \in \mathbf{X} \times \mathbf{X}$ instead of $\forall (x,y) \in X \times X$.

- pp 152: first line, item (c), we should have $\sup_{z \in \mathbf{X}} \{R(x, z) t R(z, y)\} \le R(x, y) \quad \forall x, y, z \in \mathbf{X}.$
- pp 153: the last expression should be $A_x = \{y \in \mathbf{X} \mid R(x, y) = 1\}.$
- pp 154: replace the expression $P(R) = \{X/R_{\alpha} \mid \alpha \in [0,1]\}$ by $P(R) = \{X/R_{\alpha} \mid \alpha \in [0,1]\}$.
- pp 157: first line above the expression at the bottom of the paragraph replace "is the set B that arises" by "is the set $B \in P(\mathbf{Y})$ that arises".
- pp 162: first line of section 7.2.1 replace "W: $\mathbf{Z} \times \mathbf{Y} \rightarrow [0,1]$ " by "W: $\mathbf{Z} \times \mathbf{Y} \rightarrow [0,1]$ ".
- pp 165: in item 2 we should have $B(y) = \text{truth}(\exists x | A(x) \text{ and } R_y(x))$.
- pp 167: in item 2, second paragraph $B(y) = \operatorname{truth}(\forall x \mid A(x) \text{ or } \mathbf{R}_y(x))$.
- pp 170: first line of section 7.3.1.1 replace $\mathbf{Y} \{= y_1, y_2, ..., y_m\}$ by $\mathbf{Y} = \{y_1, y_2, ..., y_m\}$.
- pp 170: procedure name is ESTIMATION-SOLUTION; replace r_{ij} by \hat{r}_{ij} and R by \hat{R} .
- pp 173: the last expression of the first paragraph should be $\hat{R}_k = U^{kT} \varphi V^k$, $U^{kT} = (U^k)^T$
- pp 175: the third expression of section 7.3.6.1 is

$$u_i = v_j \theta s_{ji} = \min(v_j \varphi s_{ji}, j = 1,...,m), i = 1,...,n$$

- pp 176: in procedure INVERSE-SOLUTION; replace u_i by \hat{u}_i and U by \hat{U} .
- pp 179: replace $\hat{R} = U^T \varphi V$ by $R = U^T \varphi V$.
- pp 180 and 181: replace all \hat{R} and \hat{R}_k by *R* and R_k , respectively.
- pp 182: Figures 7.11 and 7.12 replace *R* by **R** in the horizontal axis.
- pp 185: last line, replace $t_{m(A+B)}$ by $t_m(A+B)$ and $t_{d(A+B)}$ by $t_d(A+B)$.
- pp 186: the second expression should read

$${}^{t_d}(A*B)(z) \leq {}^t(A*B)(z) \leq {}^{t_m}(A*B)(z), \quad \forall z \in \mathbf{R}.$$

- pp 201: the complement should be $\overline{A}(x) = (\overline{A}_+(x), \overline{A}_-(x))$.
- pp 204: line 9 from the top, replace A^- by A.
- pp 221: fourth line below expression (9.2), replace "more" by "less".
- pp 282: 6th line from top, replace $A_1(x,4,5,6)$ and $A_2(y,8,10,12)$ by A(x,4,5,6) and B(y,8,10,12).
- pp 282: replace R in Figure 11.3(a) by P and R in Figure 11.3(c) by Q.
- pp 288: replace the second expression by

 $f_{is}(A(x), B(y)) = \overline{A}(x)sB(y), \quad \forall (x, y) \in \mathbf{X} \times \mathbf{Y}.$

• pp 297: the first expression for R(x,y) should be

 $R(x, y) = \min\{\min\{1, 1 - A_i(x) + B_i(y)\}, i = 1, 2, \dots, 5\}, \forall (x, y) \in \mathbf{X} \times \mathbf{Y}.$

- pp 299: replace the sub index *Y* of the Proj operator by **Y** and the *X* in the sup operator by **X**.
- pp 299: replace the *X* in the sup operator by **X**.
- pp 304: third line, replace *Ba* of the input expression by *B*.
- pp 304: there is a missing parenthesis in expression (11.18); it should read as

$$C(z) = \sup_{x, y} \{ \min[P(x, y), \max(R_i(x, y, z), i = 1, ..., N)] \}.$$

- pp 307: replace B(x) by B(y) in the second paragraph.
- pp 308: in expression (11.26) replace Z in the integral domain by **Z**.
- pp 311: last line of item 2, section 11.5.1.3, replace x and y by a and b, respectively, that is, we should have $a \oplus b = \min\{1, a + b\}$.
- pp 322: sixth line, the v_i 's should be bold: $\mathbf{v}_1[y], v_2[y], \dots, \mathbf{v}_N[y]$.
- pp 324: second line, vectors **a** and **x** have (n + 1) components as follows:

 $\mathbf{a}_{i} = [a_{0} a_{1}, a_{2},...,a_{n}]^{T}$ and $\mathbf{x} = (1, x_{1}, x_{2},...,x_{n})^{T}$.

- pp 324: eighth line from the bottom, we should have $\mathbf{z}_{ik} = [1, w_{ik}\mathbf{x}_i^{\mathrm{T}}]^{\mathrm{T}}$.
- pp 325: 18th line: Q is a $(n+1)N \times (n+1)N$ matrix and \sum is a $(M \times (n+1)N)$ matrix.
- pp 325: 19th line: the diagonal elements are $\sigma_0 \ge \sigma_1 \ge \sigma_2 \ge ... \ge \sigma_{nN}$.
- pp 325: expression (11.40) should read as follows

$$\operatorname{Min}_{\mathbf{a}} \mathbf{J}_{L}(\mathbf{a}) = \sum_{i=1}^{N} \|\mathbf{y} - Z_{i} \mathbf{a}_{i}\|^{2} = \sum_{i=1}^{N} (\mathbf{y} - Z_{i} \mathbf{a}_{i})^{T} (\mathbf{y} - Z_{i} \mathbf{a}_{i}).$$

- pp 326: second line above the bottom, the input/output pairs are $(\mathbf{x}_k, y_k), k=1, 2, \dots, M$
- pp 327: in expression (11.43), replace *N* by *M*.
- pp 327: in expression (11.43), replace *n* by *N*.
- pp 327: in expression (11.44), replace *n* by *N*.
- pp 328: in expression (11.45) and below, replace *N* by *M*.
- pp 329: in expression (11.49), replace N by M.
- pp 339: expression (12.6) should read as $y = g\left(\prod_{i=1}^{n} |x_i t_i|^{w_i}\right)$.
- pp 341: last line, replace $= 1 x_i$ by $\overline{x_i} = 1 x_i$
- pp 353: expression (12.18) should be $x(k) = AND(\mathbf{w}, [x(k-1), y(k-1)])$.
- pp 353: expression (12.19) should be $y(k) = AND(\mathbf{v}, [y(k-1), y(k-2), \overline{x}(k-1)])$.
- pp 376: first line below expression (12.56), replace " A_1 's" by " A_i 's".
- pp 375: add connection weights 0.9, 0.7, 1.0 of the *or* neuron.
- pp 393: Example 13.1, last line, replace "testing" by "training".
- pp 428: expression (14.10) should be $Y = \left[\sum_{i=1}^{c} w_{i-}u_{i}, \sum_{i=1}^{c} w_{i+}u_{i}, \right].$
- pp 428: in expressions (14.12) and (14.13) replace sub-indexes "n" by "c".

- pp 435: 5th line from the top, replace "scalar inputs" by "scalar outputs".
- pp 436: replace "*c*" by "*m*" in expression (14.18) of Example 14.2.
- pp 437: replace "*c*" by "*m*" in the first line below expression (14.19).
- pp 444: replace "Figure 14.22" by "Figure 14.21" in the 4th line.
- pp 453: expression (14.41) should have the "*i*" index in the sum replaced by "*j*".
- pp 464: second line below expression (15.2), replace " $(k_i, \beta_{doc,j}) \in [0,1]$ " by " k_i , and $\beta_{doc,j}) \in [0,1]$ "
- pp 475: 13th line from the top, replace "(15.13)" by "(15.14)".
- pp 483: replace " $\mathbf{x}_i(t+1) = f_i(\mathbf{x}(t), \mathbf{u}(t), t)$ " by " $\mathbf{x}_i(t+1) = F_i(\mathbf{x}(t), \mathbf{u}_i(t), t)$ " in expression (15.19).
- pp 484: replace " $\mathbf{x}_i(t+1) = f_i(\mathbf{x}(t), \mathbf{u}(t), t)$ " by " $\mathbf{x}_i(t+1) = F_i(\mathbf{x}(t), \mathbf{u}_i(t), t)$ " in expression (15.20).
- pp 487: replace " g_{smax} " by "supply is g_{smax} " in the third rule of (15.24).
- pp 503: delete "nondecreasing" in the second line from the top.