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/* LyX Provided Styles */ div.bibtexentry { margin-left: 2em; text-indent: -2em; }
span.bibtexlabel:before{ content: "["; } span.bibtexlabel:after{ content: "]" "; } /* Layout-provided
Styles */ h1.title { font-size: x-large; margin-bottom: 1ex; text-align: center; } div.author { font-size:
large; margin-top: 1.3ex; margin-bottom: 0.7ex; text-align: center; } div.abstract { font-size: small;
margin-top: 0.7ex; margin-bottom: 0.7ex; margin-left: 3ex; margin-right: 3ex; text-align: left; }
span.abstract_label { font-weight: bold; font-size: large; text-align: center; } div.abstract { margin:
4ex; } div.abstract_item { font-size: small; padding-top: 1ex; } div.abstract_label { font-weight: bold;
} h4.subsubsection_ { font-weight: bold; font-size: medium; margin-top: 0.7ex; margin-bottom: 0.4ex;
text-align: left; } div.standard { margin-bottom: 2ex; } div.example { text-align: left; }

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# Book Erratum

## Understanding The Analytic Hierarchy Process

### Process

Konrad Kułakowski

Abstract

Errors found in the book Understanding The Analytic Hierarchy Process [1]

#### Page 40, line 3 from the top

is

$$n_{ij} = \begin{cases} 0 & \text{if } i=j \text{ or } \{a_i, a_j\} \in E \\ 1 & \text{if } i \neq j \text{ and } \{a_i, a_j\} \notin E \end{cases} \quad \text{should be}$$

$$n_{ij} = \begin{cases} 0 & \text{if } i=j \text{ or } \{a_i, a_j\} \notin E \\ 1 & \text{if } i \neq j \text{ and } \{a_i, a_j\} \in E \end{cases}$$

#### Page 75, the numerical example is faulty. The correct version is:

and the constant term vector  $r$  is given as  $r = (\ln 6 \quad \ln 218 \quad -\ln 3 \quad \ln 367 \quad -\ln 27)$ .

Solving  $G \hat{w} = r$  leads to the following logarithmized ranking vector

$$\hat{w} = \begin{pmatrix} 1 & 100 & (22 \ln 3 + 43 \ln 6 + 2 \ln 27 - 7 \ln 367 + 8 \ln 218) & 1 & 25 & (8 \ln 3 + 2 \ln 6 + 3 \ln 27 + 2 \ln 367 + 12 \ln 218) & 1 & 100 & (22 \ln 3 - 7 \ln 6 + 2 \ln 27 + 43 \ln 367 + 8 \ln 218) & 1 & 50 & (-4 \ln 3 - \ln 6 - 14 \ln 27 - \ln 367 - 6 \ln 218) \end{pmatrix} = (1.04 \quad 1.484 \quad -2.29 \quad 0.963 \quad -1.19)$$

Hence, the (unscaled) ranking vector is  $w = (e^{1.04064} \quad e^{1.48464} \quad e^{-2.2937} \quad e^{0.96356} \quad e^{-1.19512}) = (2.83103 \quad 4.4134 \quad 0.100889 \quad 2.62103 \quad 0.302668)$ .

The last step to receive the ranking in the usual form is scaling so that the entries of the ranking vector sum up to 1. The final form of the ranking vector is as follows:  $w_{gm} = (0.275 \quad 0.429 \quad 0.0098 \quad 0.255 \quad 0.0294)$ . According to the computed ranking, the most preferred alternative is  $a_1$  with the ranking value  $w(a_2) = 0.429$ . The second place is taken by  $a_4$  with  $w(a_1) = 0.275$ , then  $a_4$ ,  $a_5$  and  $a_3$ .

Of course, one may verify that GMM applied to the following matrix  $\begin{pmatrix} 1 & 2 & 3 & 0.275 & 0.0098 \\ 0.275 & 0.255 & 9 & 3 & 2 & 1 & 0.429 & 0.0098 & 7 & 4 & 0.429 & 0.0294 & 0.0098 & 0.275 & 0.0098 \\ 0.429 & 1 & 0.0098 & 0.255 & 1 & 3 & 0.255 & 0.275 & 4 & 7 & 0.255 & 0.0098 & 1 & 9 & 1 & 9 & 0.0294 \\ 0.429 & 3 & 1 & 9 & 1 \end{pmatrix}$  results in  $w_{gm}$ .

**Page 80, line 1 from the top**

*is*

where  $p_i$  is the number of existing comparisons in the  $i$ -th row of  $C$ ,

**should be**

where  $p_i$  is the number of existing comparisons in the  $i$ -th row of  $C$  except the diagonal

**Page 81, line 12 from the bottom**

*is*

$$q_3 = \sum_{i=1}^{n-2} \sum_{j=i+1}^{n-1} \sum_{k=j+1}^n (2 - a_{ik} - a_{ij} - a_{jk} - a_{ij} - a_{jk} - a_{ik})$$

**should be**

$$q_3 = \sum_{i=1}^{n-2} \sum_{j=i+1}^{n-1} \sum_{k=j+1}^n (2 - c_{ik} - c_{ij} - c_{jk} - c_{ij} - c_{jk} - c_{ik})$$

**Page 113, line 14 from the bottom**

*is*

6.3.8.1 Effectiveness of the Koczkodaj index

**should be**

6.3.8.1 Effectiveness and the Koczkodaj index

**Page 123, line 5 from the top**

*is*

$$T_{ijk} = (1 - c_{ij} - c_{ik} - 1/c_{ij} - 1 - c_{kj} - c_{ik} - 1/c_{kj} - 1) \quad \text{should be} \quad T_{ijk} = (1 - c_{ij} - c_{ik} - 1/c_{ij} - 1 - c_{jk} - c_{ik} - 1/c_{jk} - 1)$$

**Page 150, line 11 from the bottom**

*is*

$$C = (1 - (\prod_{q=1}^r c_{1,2,q} \eta_q)^{1/r} \cdot (\prod_{q=1}^r c_{1,n,q} \eta_q)^{1/r} \cdot (\prod_{q=1}^r c_{2,1,q} \eta_q)^{1/r} \cdot \dots \cdot (\prod_{q=1}^r c_{n-1,n,q} \eta_q)^{1/r} \cdot (\prod_{q=1}^r c_{n,1,q} \eta_q)^{1/r} \cdot \dots \cdot 1)$$

**should be**

$$C = (1 - \prod_{q=1}^r c_{1,2,q} \eta_q \cdot \prod_{q=1}^r c_{1,n,q} \eta_q \cdot \prod_{q=1}^r c_{2,1,q} \eta_q \cdot \dots \cdot \prod_{q=1}^r c_{n-1,n,q} \eta_q \cdot \prod_{q=1}^r c_{n,1,q} \eta_q \cdot \dots \cdot 1)$$

**Page 150, line 7 from the bottom**

*is*

$$w(a_i) = (\prod_{k=1}^n (\prod_{q=1}^r c_{i,k,q} \eta_q)^{1/r})^{1/n}$$

**should be**

$$w(a_i) = (\prod_{k=1}^n \prod_{q=1}^r c_{i,k,q} \eta_q)^{1/n}$$

## References

1K. Kułakowski, *Understanding the Analytic Hierarchy Process* (Chapman and Hall / CRC Press, 2020).

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**Erratum can also be downloaded in the**

PDF version here

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