

The Career Atlas: Mathematical Notation

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$$\mathbf{\Lambda} = (\Lambda_1, \dots, \Lambda_n), \quad (1)$$

$$\Lambda_k = \Lambda(\mathbf{h}_k, \mathbf{\beta}_k, \mathbf{w}) = \left(\frac{1}{W} \right) \sum_{q=1}^n h_{k,q} \beta_{k,q} w_q, \quad (2)$$

$$\text{vs}_k = \text{vs}(\mathbf{h}_k, \mathbf{\beta}_k, \mathbf{w}, \mathbf{y}) = \left(\frac{1}{W} \right) \sum_{q=1}^n h_{k,q} \beta_{q,k} w_q u(y_q, y_k), \quad (3)$$

$$\beta_{k,q} = \text{eq}(s(\mathbf{a}_k, \mathbf{a}_q), c_q) \quad (4)$$

$$u(y_q, y_k) = \begin{cases} 1, & \text{if } y_k \geq y_q. \\ 0, & \text{otherwise.} \end{cases} \quad (5)$$

$$W = \sum_{q=1}^n w_q \quad (6)$$

$$\mathbf{B} = \begin{bmatrix} \beta_{1,1} & \dots & \beta_{n,1} \\ \vdots & \ddots & \vdots \\ \beta_{1,n} & \dots & \beta_{n,n} \end{bmatrix} = \begin{bmatrix} 1 & \dots & \beta_{k,1} & \dots & \beta_{n,1} \\ \vdots & \ddots & \vdots & \ddots & \vdots \\ \beta_{1,k} & \dots & 1 & \dots & \beta_{n,k} \\ \vdots & \ddots & \vdots & \ddots & \vdots \\ \beta_{1,n} & \dots & \beta_{k,n} & \dots & 1 \end{bmatrix} \quad (7)$$

$$\mathbf{\beta}_k = (\beta_{k,1}, \dots, \beta_{k,n}) \quad (8)$$

$$\mathbf{\beta}_q = (\beta_{q,1}, \dots, \beta_{q,n}) \quad (9)$$

$$\gamma_k = \left(\frac{1}{m} \right) \sum_{i=1}^m \hat{a}_i^k \quad (10)$$

$$\gamma_k = \frac{1}{m} \sum_{i=1}^m \hat{a}_i^k \quad (11)$$

$$\gamma_k = \sum_{i=1}^m \frac{\hat{a}_i^k}{m} \quad (12)$$

$$\gamma_k = \sum_{i=1}^m \hat{a}_i^k / m \quad (13)$$

$$\gamma_k = \left(\frac{1}{m} \right) \sum_{i=1}^m \frac{a_i^k}{\max_j a_j^k}, \quad (14)$$

$$\hat{\mathbf{a}}_k = (\hat{a}_1^k, \dots, \hat{a}_m^k) \quad (15)$$

$$\hat{a}_i^k = \frac{a_i^k}{\max_j a_j^k} \quad (16)$$

$$c_k = c(\mathbf{a}_k, \gamma_k) = \frac{\sum_{i=1}^m \hat{a}_i^k \tilde{a}_i^k}{\sum_{i=1}^m \hat{a}_i^k}, \quad (17)$$

$$\tilde{a}_i^k = \text{eq}(\hat{a}_i^k, \gamma_k) = \text{eq} \left(\frac{a_i^k}{\max_j a_j^k}, \gamma_k \right) \quad (18)$$

$$c_k = c(\mathbf{a}_k, \gamma_k) = \frac{\sum_{i=1}^m a_i^k \tilde{a}_i^k}{\sum_{i=1}^m a_i^k}?, \quad (19)$$

$$\ddot{\mathbf{a}}_k = (\ddot{a}_1^k, \dots, \ddot{a}_m^k) \quad (20)$$

$$\ddot{\mathbf{a}}_q = (\ddot{a}_1^q, \dots, \ddot{a}_m^q) \quad (21)$$

$$\ddot{\mathbf{a}}_n = (\ddot{a}_1^n, \dots, \ddot{a}_m^n) \quad (22)$$

$$\ddot{\mathbf{A}} = \begin{bmatrix} \ddot{a}_1^1 & \dots & \ddot{a}_m^1 \\ \vdots & \ddots & \vdots \\ \ddot{a}_1^n & \dots & \ddot{a}_m^n \end{bmatrix} \quad (23)$$

$$\ddot{\tau}_{k,q} = \text{edq}(\tau_k, \tau_q, c_q) = \left\{ 1 + \exp \left[-\frac{\tau_q(1 + \tau_k - \tau_q)}{1 - c_q} \right] \right\}^{-1} \quad (24)$$

$$\beta_{k,q} = \ddot{s}_{k,q} \times \ddot{\tau}_{k,q} = \text{eq}(s(\mathbf{a}_k, \mathbf{a}_q), c_q) \times \text{edq}(\tau_k, \tau_q, c_q) \quad (25)$$

$$\text{notation for a binary indicator (bin) operator?} \quad (26)$$

$$\text{bin}(x_{k,q}) = \begin{cases} 1, & \text{if } x_{k,q} \geq 0.5. \\ 0, & \text{otherwise.} \end{cases} \quad (27)$$

$$\text{hireability-interchangeability distinction:} \quad (28)$$

$$\text{sufficiently qualified (sq) vs sufficiently similar (ss, \beta)} \quad (29)$$

$$\text{meets minimum requirements vs same shape} \quad (30)$$

$$\text{sq}(\mathbf{a}_k, \mathbf{a}_q) = 1 - \sqrt{\frac{\sum_{i=1}^m \ddot{a}_i^q \delta(a_i^k, a_i^q)^2}{\sum_{i=1}^m \ddot{a}_i^q \max(100 - a_i^q, a_i^q)^2}}, \quad (31)$$

$$\delta(a_i^k, a_i^q) = \max(a_i^q - a_i^k, 0) \quad (32)$$

$$h_{k,q} = h(\text{sq}_{k,q}, c_q) = h(\text{sq}(\mathbf{a}_k, \mathbf{a}_q), c_q) = \ddot{s}_{k,q} = \text{eq}(\text{sq}_{k,q}, c_q) \quad (33)$$

$$\text{to be hireable is: } \text{bin}(h_{k,q}, c_q) = \begin{cases} 1, & \text{if } h_{k,q} \geq 0.5^{1-c_q}. \\ 0, & \text{otherwise.} \end{cases} \quad (34)$$

Attribute macro-flexibility: (35)

$$\Phi_i = \left(\frac{1}{W}\right) \sum_{k=1}^n \tilde{a}_i^k w_k \quad (36)$$