

$$\begin{aligned} \text{Sim}(I_1, I_3) &= \text{cosine}(I_1, I_3) = \text{cosine}((2, 5, 3), (4, 1, 4.5)) \\ &= \frac{2 \cdot 4 + 5 \cdot 1 + 3 \cdot 4.5}{\sqrt{2^2 + 5^2 + 3^2} \cdot \sqrt{4^2 + 1^2 + 4.5^2}} = \frac{26.5}{\sqrt{38} \cdot \sqrt{37.25}} = 0.7044 \end{aligned}$$

$$\begin{aligned} \text{Sim}(I_2, I_3) &= \text{cosine}(I_2, I_3) = \text{cosine}((3.5, 1, 4), (4, 1, 4.5)) \\ &= \frac{3.5 \cdot 4 + 1 \cdot 1 + 4 \cdot 4.5}{\sqrt{3.5^2 + 1^2 + 4^2} \cdot \sqrt{4^2 + 1^2 + 4.5^2}} = \frac{33}{\sqrt{29.25} \cdot \sqrt{37.25}} = 0.9997 \end{aligned}$$

$$\begin{aligned} \text{Sim}(I_4, I_3) &= \text{cosine}(I_4, I_3) = \text{cosine}((3), (1)) \\ &= \frac{3 \cdot 1}{\sqrt{3^2} \cdot \sqrt{1^2}} = \frac{3}{3} = 1 \end{aligned}$$

$$\begin{aligned} \text{Sim}(I_5, I_3) &= \text{cosine}(I_5, I_3) = \text{cosine}((2, 5, 3), (4, 1, 4.5)) \\ &= \frac{2 \cdot 4 + 5 \cdot 1 + 3 \cdot 4.5}{\sqrt{2^2 + 5^2 + 1^2} \cdot \sqrt{4^2 + 1^2 + 4.5^2}} = \frac{26.5}{\sqrt{38} \cdot \sqrt{37.25}} = 0.7044 \end{aligned}$$

$$\begin{aligned} r(U_1, I_3) &= \left( \frac{1}{0.7044 + 0.9997 + 1 + 0.7044} \right) (3.5 \cdot 0.7044 + 2 \cdot 0.9997 + \\ &= \left( \frac{1}{3.4085} \right) (12.4868) = 3.6634 \approx 3.7 \end{aligned}$$