PARAMETAR a_i

PRINCIP ULANČAVANJA PARCIJALNIH DERIVACIJA:

$$\frac{\partial E_k}{\partial a_i} = \frac{\partial E_k}{\partial o_k} \cdot \frac{\partial o_k}{\partial \alpha_i} \cdot \frac{\partial \alpha_i}{\partial a_i}$$

$$\boxed{\frac{\partial E_k}{\partial o_k} = -(y_k - o_k)}$$

$$\frac{\partial o_k}{\partial \alpha_i} = \frac{\left(\sum_{j=1}^{m} \alpha_j z_j\right)'_{\alpha_i} \left(\sum_{j=1}^{m} \alpha_j\right) - \left(\sum_{j=1}^{m} \alpha_j z_j\right) \cdot \left(\sum_{j=1}^{m} \alpha_j\right)'_{\alpha_i}}{\left(\sum_{j=1}^{m} \alpha_j\right)^2}$$

$$= \frac{z_i \cdot \left(\sum_{j=1}^{m} \alpha_j\right) - \left(\sum_{j=1}^{m} \alpha_j z_j\right) \cdot 1}{\left(\sum_{j=1}^{m} \alpha_j\right)^2} = \frac{\sum_{j=1}^{m} \alpha_j z_i - \sum_{j=1}^{m} \alpha_j z_j}{\left(\sum_{j=1}^{m} \alpha_j\right)^2}$$

$$\boxed{\frac{\partial o_k}{\partial \alpha_i} = \frac{\sum_{j=1,\, j \neq i}^{m} \alpha_j (z_i - z_j)}{\left(\sum_{j=1}^{m} \alpha_j\right)^2}}$$

$$\frac{\partial \alpha_i}{\partial a_i} = \frac{\partial (\mu_{A_i} \cdot \mu_{B_i})}{\partial a_i} = \frac{\partial \mu_{A_i}}{\partial a_i} \cdot \mu_{B_i}$$

$$\frac{\partial \mu_{A_i}}{\partial a_i} = \mu_{A_i}(1-\mu_{A_i}) \cdot \frac{\partial(-b_i(x-a_i))}{\partial a_i} = \boxed{\mu_{A_i}(1-\mu_{A_i}) \cdot b_i}$$

$$\frac{\partial E_k}{\partial a_i} = -(y_k - o_k) \cdot \frac{\sum_{j=1,\, j \neq i}^{m} \alpha_j (z_i - z_j)}{\left(\sum_{j=1}^{m} \alpha_j\right)^2} \cdot \mu_{A_i}(1-\mu_{A_i}) \cdot b_i \cdot \mu_{B_i}$$

STOHASTIČKO AŽURIRANJE:

$$a_i(t+1) = a_i(t) + \eta \cdot (y_k - o_k) \cdot \frac{\sum_{j=1,\, j \neq i}^{m} \alpha_j (z_i - z_j)}{\left(\sum_{j=1}^{m} \alpha_j\right)^2} \cdot \mu_{A_i}(1-\mu_{A_i}) \cdot b_i \cdot \mu_{B_i}$$

GRUPNO AŽURIRANJE:

$$a_i(t+1) = a_i(t) + \eta \cdot \sum_{k=1}^{N} (y_k - o_k) \cdot \frac{\sum_{j=1,\, j \neq i}^{m} \alpha_j (z_i - z_j)}{\left(\sum_{j=1}^{m} \alpha_j\right)^2} \cdot \mu_{A_i}(1-\mu_{A_i}) \cdot b_i \cdot \mu_{B_i}$$