$$\vec{w}_1^{(1)} = \vec{w}_1^{(0)} - \frac{\partial E_{in}}{\partial \vec{w}_1} = (0,0,0)^T - \left(-\frac{2}{3}, -5, -3\right)^T = (\frac{2}{3}, 5,3)^T$$

$$\vec{w}_2^{(1)} = \vec{w}_2^{(0)} - \frac{\partial E_{in}}{\partial \vec{w}_2} = (0,0,0)^T - \left(\frac{1}{3}, 1,0\right)^T = (-\frac{1}{3}, -1,0)^T$$

$$\vec{w}_3^{(1)} = \vec{w}_3^{(0)} - \frac{\partial E_{in}}{\partial \vec{w}_3} = (0,0,0)^T - \left(\frac{1}{3}, 4,3\right)^T = (-\frac{1}{3}, -4, -3)^T$$

根据$\vec{w}_1^{(1)}$，$\vec{w}_2^{(1)}$和$\vec{w}_3^{(1)}$，我们用式（1）得到：

对于$\vec{x}_1$，我们有：$s_1 = \vec{w}_1^T \vec{x}_1 = \left(\frac{2}{3}, 5,3\right)\begin{pmatrix}1\\3\\0\end{pmatrix} = 15.67$，$s_2 = \vec{w}_2^T \vec{x}_1 = \left(-\frac{1}{3}, -1,0\right)\begin{pmatrix}1\\3\\0\end{pmatrix} = -3.33$，$s_3 = \vec{w}_3^T \vec{x}_1 = \left(-\frac{1}{3}, -4, -3\right)\begin{pmatrix}1\\3\\0\end{pmatrix} = -12.33$

利用式（2），我们可以得到：$\hat{y}_1 = \frac{e^{s_1}}{e^{s_1}+e^{s_2}+e^{s_3}} = 1.00$，$\hat{y}_2 = \frac{e^{s_2}}{e^{s_1}+e^{s_2}+e^{s_3}} = 0.00$，$\hat{y}_3 = \frac{e^{s_3}}{e^{s_1}+e^{s_2}+e^{s_3}} = 0.00$，即，$\vec{\hat{Y}}_1 = (1.00,0.00,0.00)^T$，对照$\vec{Y}_1 = (1,0,0)^T$，此时对于样本$\vec{x}_1$分类是正确的。

同理：对于$\vec{x}_2$，我们有$s_1 = 33.67$，$s_2 = -3.33$，$s_3 = -30.33$，对应的我们可以计算出$\vec{\hat{Y}}_2 = (1.00,0.00,0.00)^T$，对照$\vec{Y}_2 = (1,0,0)^T$，此时对于样本$\vec{x}_2$分类是正确的。

对于$\vec{x}_3$，我们有$s_1 = 9.67$，$s_2 = -0.33$，$s_3 = -9.33$，对应的我们可以计算出$\vec{\hat{Y}}_3 = (1.00,0.00,0.00)^T$，对照$\vec{Y}_3 = (0,1,0)^T$，此时对于样本$\vec{x}_3$分类是错误的。

对于$\vec{x}_4$，我们有$s_1 = -14.33$，$s_2 = 2.67$，$s_3 = 11.67$，对应的我们可以计算出$\vec{\hat{Y}}_4 = (0.00,0.00,1.00)^T$，对照$\vec{Y}_4 = (0,0,1)^T$，此时对于样本$\vec{x}_4$分类是正确的。

第三个样本错分，计算$E_{in} = (-ln1 - ln1 - ln0 - ln1)/4 = \infty$

第二次迭代：我们需要按照式（6）重新计算梯度去得到新的$\vec{w}_k$，仍以计算$\vec{w}_1$为例，先用式（6）计算梯度：