calculation

Donnerstag, 26. Mai 2022 12:00

a) $\vec{\mu}_0 = \frac{1}{6} \cdot \begin{pmatrix} 1+2+1{,}5+2+2+3 \\ 1+1+2+2+3+3 \end{pmatrix}$

$= \frac{1}{6} \cdot \begin{pmatrix} 11{,}5 \\ 12 \end{pmatrix} = \underline{\begin{pmatrix} \frac{23}{12} \\ 2 \end{pmatrix}}$

$\vec{\mu}_1 = \frac{1}{6} \cdot \begin{pmatrix} 1{,}5+2{,}5+3{,}5+2{,}5+3{,}5+4{,}5 \\ 1+1+1+2+2+2 \end{pmatrix}$

$= \frac{1}{6} \cdot \begin{pmatrix} 18 \\ 9 \end{pmatrix} = \underline{\begin{pmatrix} 3 \\ \frac{3}{2} \end{pmatrix}}$

$S_0 = \sum_i^6 (\vec{x}_i - \vec{\mu}_0)(\vec{x}_i - \vec{\mu}_0)^T$

$= \begin{pmatrix} \frac{121}{144} & \frac{11}{12} \\ \frac{11}{12} & 1 \end{pmatrix} + \begin{pmatrix} \frac{1}{144} & -\frac{1}{12} \\ -\frac{1}{12} & 1 \end{pmatrix} + \begin{pmatrix} \frac{25}{144} & 0 \\ 0 & 0 \end{pmatrix} + \begin{pmatrix} \frac{1}{144} & 0 \\ 0 & 0 \end{pmatrix} + \begin{pmatrix} \frac{1}{144} & \frac{1}{12} \\ \frac{1}{12} & 1 \end{pmatrix} + \begin{pmatrix} \frac{169}{144} & \frac{13}{12} \\ \frac{13}{12} & 1 \end{pmatrix}$

$= \underline{\begin{pmatrix} \frac{53}{24} & 2 \\ 2 & 4 \end{pmatrix}}$

$S_1 = \sum_i^6 (\vec{x}_i - \vec{\mu}_1)(\vec{x}_i - \vec{\mu}_1)^T$

$= \begin{pmatrix} \frac{9}{4} & \frac{3}{4} \\ \frac{3}{4} & \frac{1}{4} \end{pmatrix} + \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} + \begin{pmatrix} \frac{1}{4} & -\frac{1}{4} \\ -\frac{1}{4} & \frac{1}{4} \end{pmatrix} + \begin{pmatrix} \frac{1}{4} & -\frac{1}{4} \\ -\frac{1}{4} & \frac{1}{4} \end{pmatrix} + \begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix} + \begin{pmatrix} \frac{9}{4} & \frac{3}{4} \\ \frac{3}{4} & \frac{2}{4} \end{pmatrix}$

$= \underline{\begin{pmatrix} \frac{11}{2} & \frac{3}{2} \\ \frac{3}{2} & \frac{3}{2} \end{pmatrix}}$

$\Rightarrow \underline{S_{01} = \begin{pmatrix} \frac{185}{24} & \frac{7}{2} \\ \frac{7}{2} & \frac{11}{2} \end{pmatrix}}$

6)