〈Basic Linear Algebra〉

Inverse Matrix

Inverse of a 2×2 matrix

$$\begin{pmatrix} a & b \\ c & d \end{pmatrix}^{-1} = \frac{1}{ad-bc}\begin{pmatrix} d & -b \\ -c & a \end{pmatrix} \tag{0.10}$$

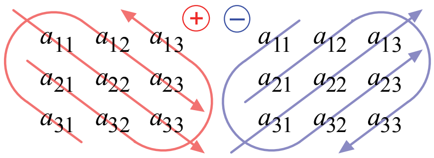
Determinant

Determinant of a 2×2 matrix

$$\begin{vmatrix} a & b \\ c & d \end{vmatrix} = ad - bc \tag{0.11}$$

Determinant of a 3×3 matrix

$$\begin{vmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{vmatrix} \begin{aligned} &= a_{11}a_{22}a_{33} + a_{21}a_{32}a_{13} + a_{31}a_{12}a_{23} \\ &\quad - a_{11}a_{32}a_{23} - a_{21}a_{12}a_{33} - a_{31}a_{22}a_{13} \end{aligned} \tag{0.12}$$



Eigenvalue and Eigenvector

The eigenvalues, λ_1, λ_2, ..., λ_n, of n-dimensional square matrix $\mathbf{A}$ can be calculated as the solutions to the eigen equation,

$$\left|\mathbf{A} - \lambda\mathbf{E}\right| = 0 \tag{0.13}$$

The corresponding eigenvector $\mathbf{s}_i$ can be obtained from the definition,

$$\mathbf{A}\mathbf{s}_i = \lambda_i \mathbf{s}_i \tag{0.14}$$

For example for a 2×2 matrix, $\mathbf{A} = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$, the eigen equation is

$$\left|\mathbf{A} - \lambda\mathbf{E}\right| = \begin{vmatrix} a-\lambda & b \\ c & d-\lambda \end{vmatrix} = (a-\lambda)(d-\lambda) - bc = 0$$

〈Arrhenius Equation〉

The temperature dependence of rate constants can be expressed by the Arrhenius equation or the modified Arrhenius equation.

$$k = A\exp\left(-\frac{E_\mathrm{a}}{RT}\right) \quad \text{Arrhenius equation} \tag{0.15}$$

$$k = AT^b\exp\left(-\frac{E_\mathrm{a}}{RT}\right) \quad \text{Modified Arrhenius equation} \tag{0.16}$$

〈Schedule〉

[5] June 27 (Wed) 8:40~
[6] July 2 (Mon) 13:00~
[7] July 4 (Wed) 8:40~
[8] July 9 (Mon) 13:00~ [Problem-2] <u>Due Date: 17:00 July 23</u> (to the box in the dept. office)

The paper (report) must be submitted until the due date.
Submissions via e-mail will not be accepted.