

$$p(\mathbf{x} | \boldsymbol{\mu}, \boldsymbol{\Sigma}) = \frac{1}{(2\pi)^{d/2} |\boldsymbol{\Sigma}|^{1/2}} \exp \left\{ -\frac{1}{2} (\mathbf{x} - \boldsymbol{\mu})^\top \boldsymbol{\Sigma}^{-1} (\mathbf{x} - \boldsymbol{\mu}) \right\}$$

Diagram illustrating the components of the Multivariate Gaussian distribution formula:

- normalising constant**: Points to the fraction $\frac{1}{(2\pi)^{d/2} |\boldsymbol{\Sigma}|^{1/2}}$.
- mean**: Points to $\boldsymbol{\mu}$.
- variance**: Points to $\boldsymbol{\Sigma}$.
- make sure $p(x) > 0$** : Points to the \exp function.
- distance measure between \mathbf{x} and $\boldsymbol{\mu}$** : Points to the quadratic form $(\mathbf{x} - \boldsymbol{\mu})^\top \boldsymbol{\Sigma}^{-1} (\mathbf{x} - \boldsymbol{\mu})$.
- inversely related to $p(x)$** : Points to the negative sign and the fraction $\frac{1}{2}$.