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Probability plot

ZTS

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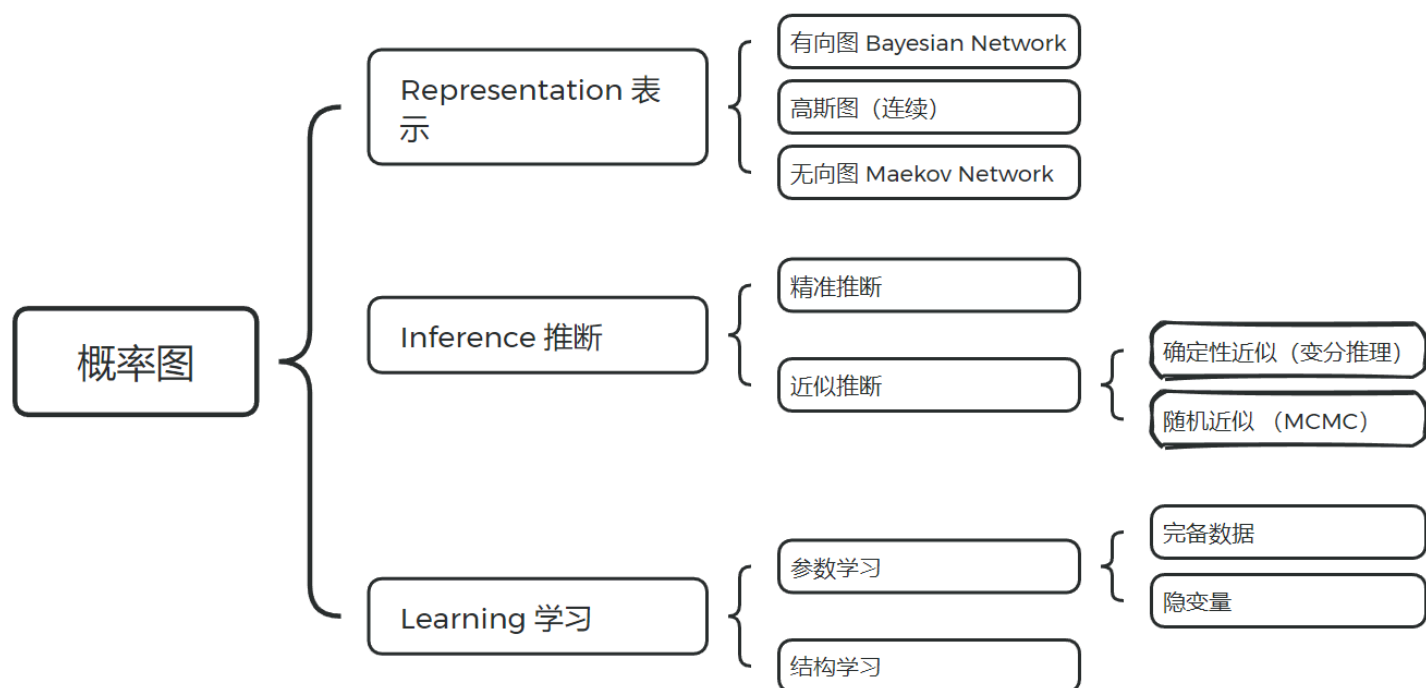


Figure 1: Introduction to Probabilistic Graphical Models.

$$\text{高维随机变量 } P(x_1, x_2 \cdots x_p) = \begin{cases} \text{边缘概率 } p(x_i) \\ \text{条件概率 } p(x_j | x_i) \end{cases}$$

✓ Sum rule: $p(x_1) = \int p(x_1, x_2) dx_2$

✓ Product Rule: $p(x_2) = p(x_1)p(x_2|x_1) = p(x_2)p(x_1|x_2)$

✓ Chain Rule: $p(x_1, x_2, \cdots x_p) = \prod_{i=1}^p p(x_i | x_1, x_3 \cdots x_{p-1})$

✓ “Bayesian Rule: $p(x_2|x_1) = \frac{p(x_1, x_2)}{p(x_1)} = \frac{p(x_1, x_2)}{\int p(x_1, x_2) dx_2} = \frac{p(x_2)p(x_1|x_2)}{\int p(x_2)p(x_1|x_2) dx_2}$

高维随机变量的困难:

✓ 维度高, 计算复杂, $p(x_1, x_2, \cdots x_p)$ 的计算量太大