1. 设值点 $x_0, x_1, \ldots, x_n$, 则因为 Lagrange 插值基函数
证明
(1) \[ \sum_k \ell_k(x) = 1 \]
(2) \[ \sum_k x_i^j \ell_k(x) = x_i^j \text{ for } j = 0, 1, \ldots, n \]
(3) \[ \sum_k (x_k - x_i)^j \ell_k(x) = 0 \text{ for } j = 1, \ldots, n \]

2. 证明 Newton 差商的各条性质.

3. 对 Lebesgue 常数证明

\[ L_n(x; X) = \sum_{k=0}^n |\ell_k(x)| \]

\[ \Delta_n(x) = \| L_n(x; X) \|_\infty \]