
2.Line Search Methods

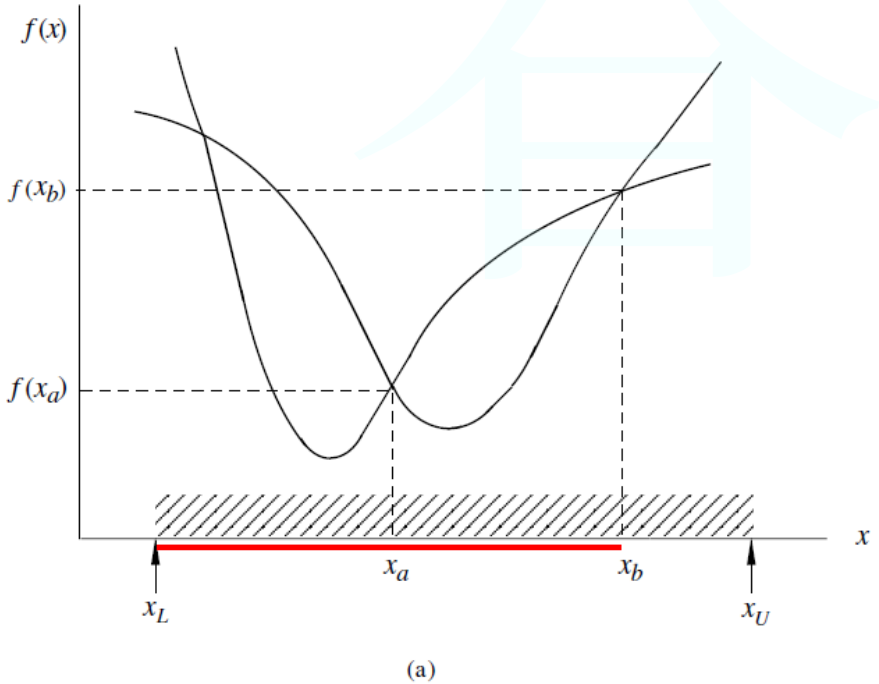
给定区间 $\left[x_L \quad x_U \right]$ 取两点 x_a, x_b

$a) f\left(x_a\right) < f\left(x_b\right)$

$\mathrm{b}) f\left(x_a\right) > f\left(x_b\right)$

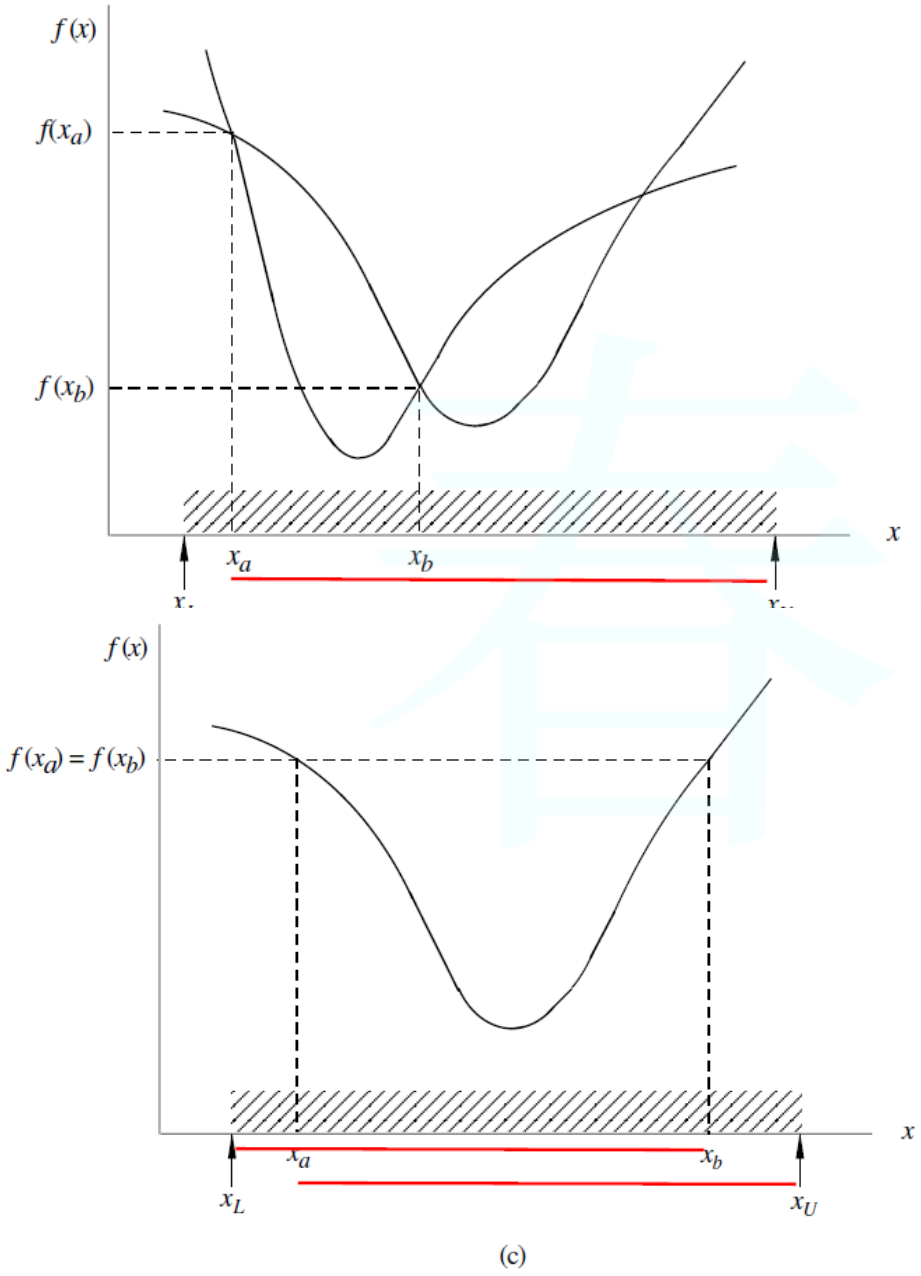
$c) f\left(x_a\right) == f\left(x_b\right)$

$a) f\left(x_a\right) < f\left(x_b\right)$



(a)

$\longrightarrow \quad \left[x_L \quad x_b \right]$



$$b) f\left(x_a\right) > f\left(x_b\right)$$

$$\longrightarrow \quad \left[\begin{array}{cc} x_a & x_U \end{array}\right]$$

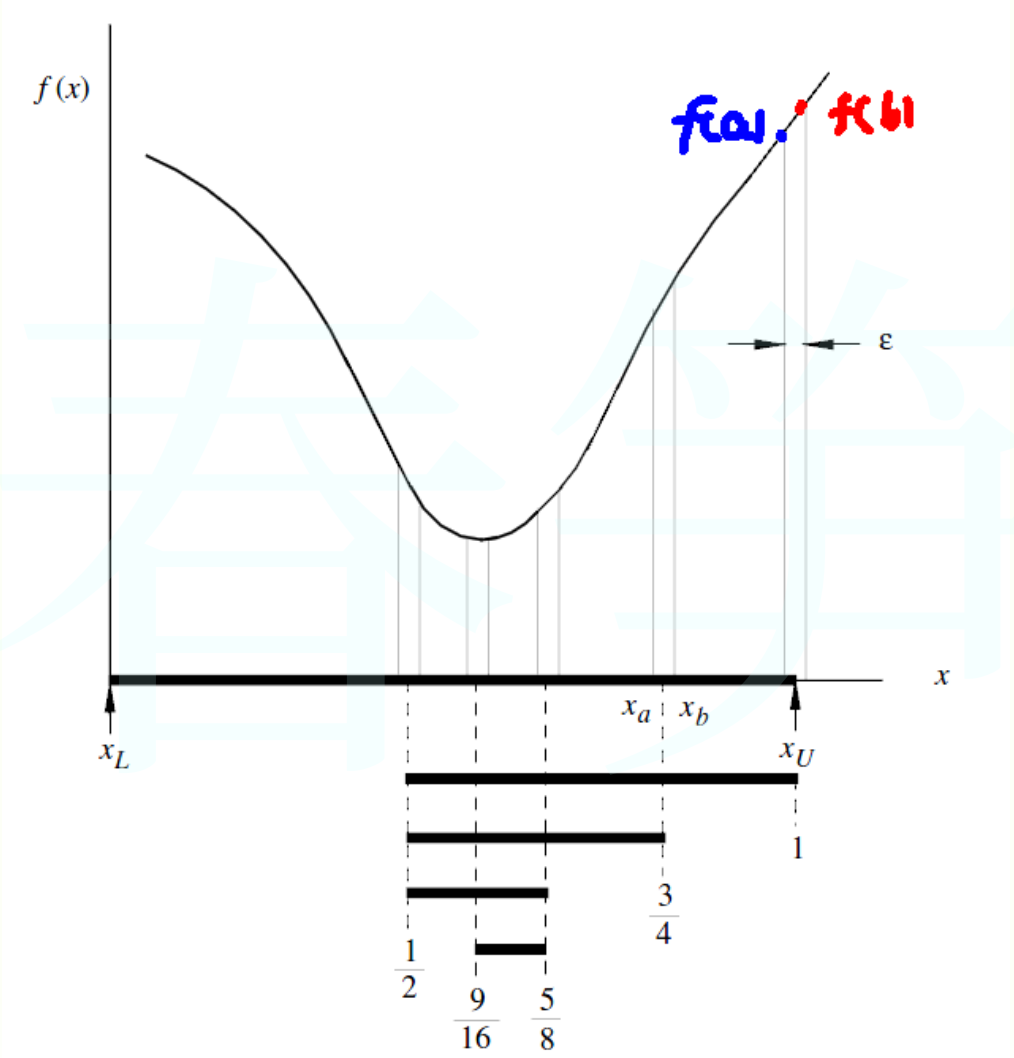
$$b) f\left(x_a\right) == f\left(x_b\right)$$

$$\longrightarrow \left[\begin{array}{cc} x_L & x_b \end{array}\right] \quad \text{or} \quad \left[\begin{array}{cc} x_a & x_U \end{array}\right]$$

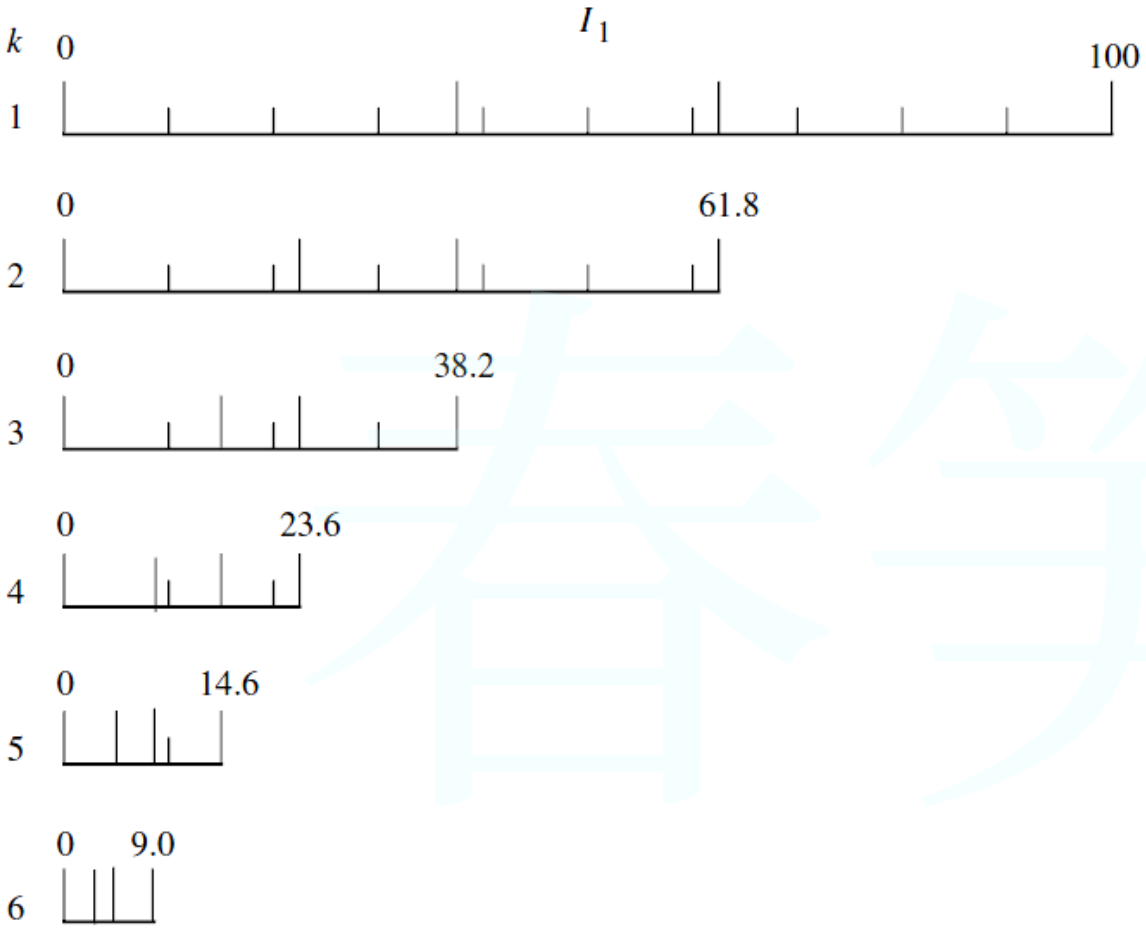
典型线搜法：

1. Dichotomous search
2. Fibonacci search
3. Golden-section search
4. Cubic interpolation method
5. Armijo
6. Wolfe

Dichotomous Search



Golden section search



Wolfe Condition

a) $q(t) \leqslant q(0) + m_1 t q'(0)$ and $q'(t) \geqslant m_2 q'(0)$	(then terminate);
b) $q(t) > q(0) + m_1 t q'(0)$	(then $t_R = t$);
c) $q(t) \leqslant q(0) + m_1 t q'(0)$ and $q'(t) < m_2 q'(0)$	(then $t_L = t$).

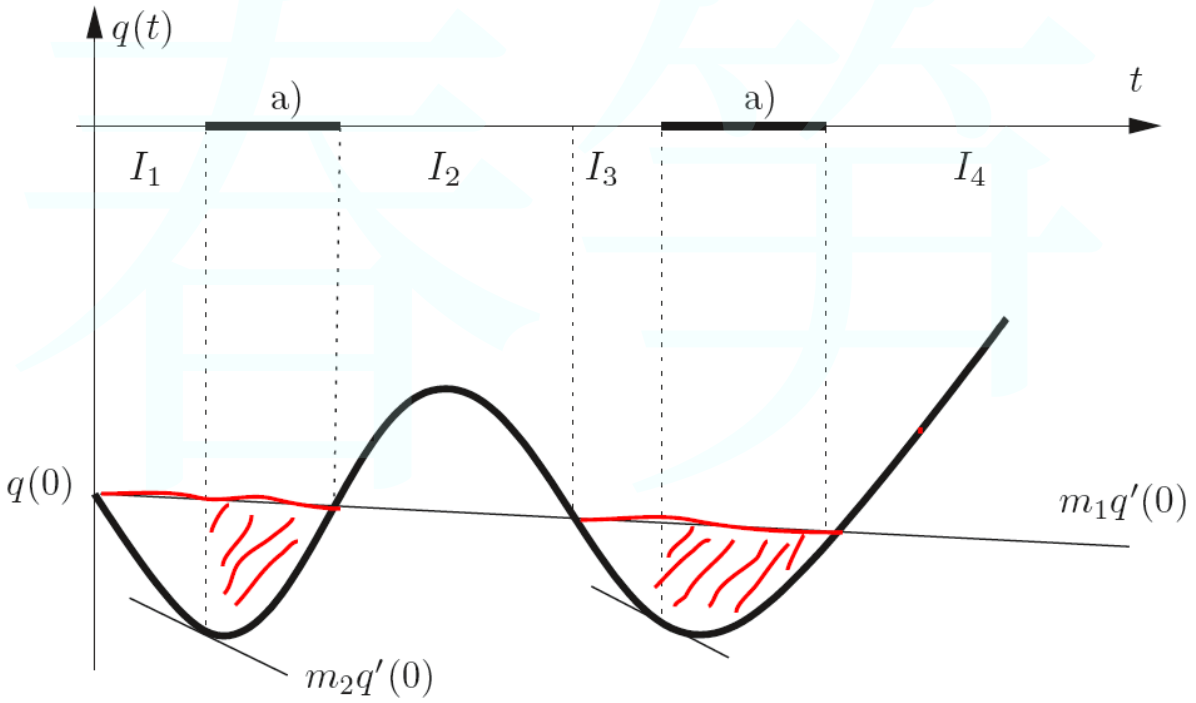


Fig. 3.2. Wolfe's rule

Armijo

a)	$q(t) \leqslant q(0) + m_1 t q'(0)$	(then terminate);
b)	$q(t) > q(0) + m_1 t q'(0)$	(then $t_R = t$);
c)	never.	