

欧纪阳 2019/4/22 00:16



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0.3-15

$$(a) 8.3 = (1000, 0100)_2 = 1.0000100 \times 2^3$$

$$= +1.0000100 \cdots 1001010 \times 2^3$$

$$7.3 = (111, 0100)_2 = 1.110100 \times 2^2$$

$$= +1.110100 \cdots 10011 \times 2^2$$

$$8.3 - 7.3 = 1.0000100 \cdots 101010 \times 2^3$$

$$- 0.1110100 \cdots 10011 \times 2^3$$

$$0.00100000 \cdots 00001 \times 2^3$$

$$= 1.00000000 \cdots 0100$$

$$\therefore 8.3 - 7.3 = 2^{-5}$$

$$(b) 8.4 - 7.4 = 1.0000110 \cdots 011010 \times 2^3$$

$$- 0.1110110 \cdots 011010 \times 2^3$$

$$0.001 \times 2^3$$

$$= 1.0$$

$$\therefore 8.4 - 7.4 = 0$$

$$(c) 8.8 - 8.7 = 1.0001100 \cdots 1101010 \times 2^3$$

$$- 0.1111100 \cdots 110011 \times 2^3$$

$$0.0010000 \cdots 000001 \times 2^3$$

$$= 1.0000000 \cdots 00100$$

$$\therefore 8.8 - 8.7 = 2^{-5}$$

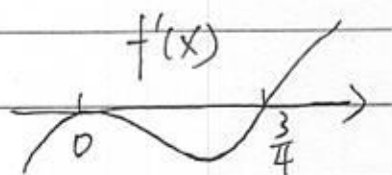


1-1-5  $f(x) = x^4 - x^3 - 10$   $f'(x) = 4x^3 - 3x^2 = x^2(4x - 3)$

(a)  $f(-2) = 14$   $f(-1) = -8$

$f(0) = -10$   $f(1) = -10$

$f(2) = -2$   $f(3) = 44$



∴ 区间  $[-2, -1]$ ,  $[2, 3]$  分别包含一个解

(b)  $\frac{1}{2^{n+1}} < 0.5 \times 10^{-10} \Rightarrow \frac{1}{2^n} < 10^{-10} \Rightarrow 2^n > 10^{10}$

$\Rightarrow n > \log_2 10^{10} = \frac{10}{\log_{10} 2} \approx \frac{10}{0.301} \approx 34$

1-2-5

(a)  $g(\sqrt{3}) = 1 + \sqrt{3}$  不是不动点

(b)  $g(\sqrt{3}) = \frac{2\sqrt{3}}{3} + \frac{1}{\sqrt{3}} = \sqrt{3}$  是不动点

(c)  $g(\sqrt{3}) = 3 - \sqrt{3} + \sqrt{3}$  不是不动点

(d)  $g(\sqrt{3}) = 1 + \frac{2}{\sqrt{3}+1} = \sqrt{3}$  是不动点

1-2-10

(a)  $g(x) = x \Rightarrow x^2 - \frac{5}{2}x + \frac{3}{2} = 0 \Rightarrow r = 1, \frac{3}{2}$

$g'(x) = 2x - \frac{5}{2}$   $|g'(1)| = \frac{1}{2} < 1$  收敛  $|g'(\frac{3}{2})| = \frac{3}{2} > 1$  不收敛

(b)  $g(x) = x \Rightarrow x^2 - \frac{1}{2}x - \frac{1}{2} = 0 \Rightarrow r = -\frac{1}{2}, 1$

$g'(x) = 2x + 1$   $|g'(-\frac{1}{2})| = \frac{1}{2} < 1$  收敛  $|g'(1)| = \frac{5}{2} > 1$  不收敛



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1.2-29  $\frac{x^3}{c} + \frac{4c}{c}x - \frac{2}{c} = x \quad g(x) = \frac{x^3}{c} + \frac{4c}{c}x - \frac{2}{c}$

(a)  $g'(x) = \frac{3}{c}x^2 + \frac{4+c}{c} \quad |g'(1)| < 1 \Rightarrow \left| \frac{4}{c} + 1 \right| < 1 \Rightarrow c < -2$

(b) 当  ~~$c \rightarrow -\infty$  时  $c \rightarrow -\infty$  时  $s \rightarrow 1$ , 收敛最快~~  
 $c = -4$  时,  $s = 0$ , 收敛最快

1.2-31  $x^2 + x - \frac{5}{16} = 0 \Rightarrow (x + \frac{5}{4})(x - \frac{1}{4}) = 0 \Rightarrow r = -\frac{5}{4}, \frac{1}{4}$

$g_1(x) = \frac{5}{16} - x^2, g_1'(x) = -2x \quad |g_1'(\frac{1}{4})| = \frac{1}{2} < 1$

~~$g_2(x) = \frac{5}{16}x^2 + 2x - \frac{5}{16}, g_2'(x) = 2x + 2 \quad |g_2'(-\frac{5}{4})| = \frac{1}{2} < 1$~~

图见文件

1.3-2  $|f - \frac{1}{3}| \approx 0.3333 \approx 3 \times 10^{-5}$

(a)  $BE = |f(0.3333)| = 10^{-4}$

(b)  $BE = |f(0.3333)| = 10^{-8}$

(c)  $BE = |f(0.3333)| = 10^{-12}$

(d)  $BE = |f(0.3333)| = 0.0464$