$\LaTeX$ Practice

August 26, 2021

1 Basic

[1-1]

$$\sum_{n=1}^{\infty} \frac{b_n}{(z-z_0)^n}$$

[1-2]

$$\left(\sum_{i=1}^{n} x_i^2\right)\left(\sum_{i=1}^{n} y_i^2\right) \geq \left(\sum_{i=1}^{n} x_i y_i\right)^2$$

[1-3]

$$u(\rho e^{i\phi}) = \frac{(r^2-\rho^2)}{2\pi}\int_0^{2\pi} \frac{u(re^{i\theta})}{r^2-2r\rho\cos(\theta-\phi)+\rho^2} d\theta.$$

[1-4]

$$N(\alpha) = p_1^{\alpha_1} p_2^{\alpha_2} \cdots p_s^{\alpha_s}.$$

[1-5]

$$P(z) = \prod_{n=1}^{\infty} E_p\left(\frac{z}{a_n}\right).$$

[1-6]

$$|E_T| \leq \frac{b-a}{12} h^2 \max|f''(x)| = \frac{1}{2}\left(\frac{1}{n}\right)\max\left|\frac{2}{x^3}\right|.$$

[1-7]

$$f(c) = \frac{1}{b-a}\int_a^b f(x)dx.$$

[1-8]

$$(x_1^2+\cdots+x_n^2)(y_1^2+\cdots+y_n^2) \geq (x_1y_1+\cdots+x_ny_n)^2.$$

[1-9]

$$\left(\frac{a}{p}\right) \equiv a^{\frac{p-1}{2}} \pmod{p}.$$

2 Intermediate

[2-1]

$$\begin{aligned} c(n) &= \sum_{n \le x} a_n - 2\int_1^{[x]} \log t dt \\ &= 2x \log x - 2[x] \log[x] - 2 + O(x) \\ &= O(x) \end{aligned}$$

[2-2]

$$x_1 \begin{pmatrix} a_{11} \\ \vdots \\ a_{m1} \end{pmatrix} + \cdots + x_n \begin{pmatrix} a_{1n} \\ \vdots \\ a_{mn} \end{pmatrix} = 0$$

[2-3]

$$\begin{pmatrix} a_{11} & a_{12} & \cdots & a_{1n} \\ 0 & a_{22} & \cdots & a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ 0 & 0 & \cdots & a_{nn} \end{pmatrix}$$

[2-4]

$$A(BC) = \begin{pmatrix} 2 & 1 & 5 \\ 1 & 3 & 2 \end{pmatrix} \begin{pmatrix} -1 & 5 \\ -3 & -5 \\ 1 & 5 \end{pmatrix} = \begin{pmatrix} 0 & 30 \\ -8 & 0 \end{pmatrix}$$

[2-5]

$$\begin{array}{ccccccc} A^1 & = & b_{11}X^1 & + & \cdots & + & b_{n1}X^n \\ \vdots & & \vdots & & & & \vdots \\ A^n & = & b_{1n}X^1 & + & \cdots & + & b_{nn}X^n \end{array}$$

[2-6]

$$f(x) = \begin{cases} x^2 + 1, & x \le 0 \\ x^4 - 3x^2 - 7x + 1, & 0 \ge x \ge 1 \\ \dfrac{2x}{x^2+1}, & x \ge 1 \end{cases}$$

[2-7]

$$\begin{pmatrix} \begin{bmatrix} x & y \\ z & w \end{bmatrix} \\ a \\ b \end{pmatrix}$$

[2-8]

$$\begin{aligned} a+b+c \qquad\qquad\quad & \\ b+c+d \qquad & \\ c+d+e & \\ a+2b+3c+2d+e & \end{aligned}$$

[2-9]

$$\begin{aligned} F_i &= x_i f_i - g_i & G_j &= y_j g_j - f_i & H_k &= L_k + 1 \\ f_i &= F_{i-1} + G_{i-1} & g_j &= F_{j-1} - G_{j-1} & L_k &= \{H_{k-1}\}^2 \end{aligned}$$