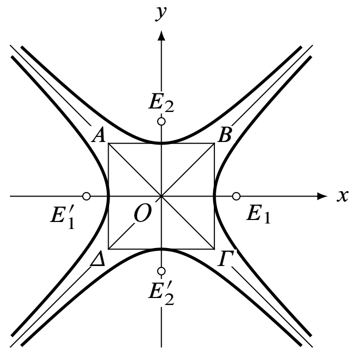
Κεφάλαιο 1
Απειροστικός Λογισμός

1.1 Μετασχηματισμοί Laplace



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Έστω

$$\mathcal{L}\{f(t)\} = F(s) = \int_0^\infty e^{-st} f(t) dt$$

Τριπλό Ολοκλήρωμα.

Έστω μια συνάρτηση τριών μεταβλητών $f : \mathbb{R}^3 \to \mathbb{R}$. Το τριπλό ολοκλήρωμα ορίζεται ως εξής :

$$\iiint_S f(x,y,z) dx dy dz$$

$$a = \frac{M_{20}}{M_{00}} - x_c^2, \quad b = 2\left(\frac{M_{11}}{M_{00}} - x_c y_c\right), \quad c = \frac{M_{02}}{M_{00}} - y_c^2,$$

$$\begin{aligned} x_c &= \frac{M_{10}}{M_{00}}, \quad y_c = \frac{M_{01}}{M_{00}}, \\ M_{ij} &= \sum_x \sum_y x^i y^j I(x,y) \end{aligned} \tag{1.1}$$

Επίσης θα έχουμε

$$\begin{aligned} q^* =& \left(\frac{\alpha^* W}{U\big(1+\alpha^*(\frac{W}{q_u^*})\big)}\right)\overline{C}_1\overline{C}_3 - \left(\frac{W_{(i-1)} - 2W_i + W_{(i+1)}}{(\Delta X)^2}\right) \times \\ & \left(G_1^* + \overline{C}_2(T_p^* + T_1^*)\cos\theta + G_2^*\overline{C}_1 + G_3^*\overline{C}_1\overline{C}_3 + \overline{C}_1\overline{C}_4(T_p^* + T_2^*)\cos\theta\right) \end{aligned} \tag{1.2α′}$$

$$\begin{aligned} \frac{\partial T_1^*}{\partial X} =& -\left(q^* + G_1^*\frac{\partial^2 W}{\partial X^2}\right)\overline{D}_1 - \overline{D}_2\left(\overline{C}_3\frac{\alpha^* W}{U\big(1+\alpha^*(\frac{W}{q_u^*})\big)}\right. \\ & \left. - \left(G_2^* + G_3^*\overline{C}_3 + \overline{C}_4(T_p^* + T_2^*)\cos\theta\right)\frac{\partial^2 W}{\partial X^2}\right) \end{aligned} \tag{1.2β′}$$

$$\begin{cases} \oint_S f(u,v) du dv \\ \sum_{x \in \mathbb{K}} x^i = 1 + x + x^2 + \ldots + x^k \end{cases}$$