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10 Apêndice

É demonstrado o processo de obtenção da aceleração nas direções x e y, adaptado de Wen (1975):

$$a_{cx} = u_t + u.u_x + v.u_y + w.u_z \quad (10.1)$$

$$a_{cy} = v_t + u.v_x + v.v_y + w.v_z \quad (10.2)$$

onde u, v e w são dados no texto (eq. 3.5).

$$u_t = -r_t.(T_r.\text{sen}\phi + R_r.\cos\phi) + T_t.(T\cos\phi - R\text{sen}\phi) \quad (10.3)$$

$$v_t = r_t.(T_r.\cos\phi + R_r.\text{sen}\phi) + T_t.(T\text{sen}\phi + R\cos\phi) \quad (10.4)$$

$$u_x = u_r.r_x + u_\phi.\phi_x \quad (10.5)$$

$$u_y = u_r.r_y + u_\phi.\phi_y \quad (10.6)$$

$$v_x = v_r.r_x + v_\phi.\phi_x \quad (10.7)$$

$$v_y = v_r.r_y + v_\phi.\phi_y \quad (10.8)$$

$$u_z = -T_z.\text{sen}\phi - R_z.\cos\phi + U_{0z}.\text{sen}\beta \quad (10.9)$$

$$v_z = T_z.\cos\phi - R_z.\text{sen}\phi + U_{0z}.\text{sen}\beta \quad (10.10)$$

$$u_\phi = -T\cos\phi + R\text{sen}\phi \quad (10.11)$$

$$v_\phi = -T\text{sen}\phi - R\cos\phi \quad (10.12)$$

$$r = \frac{[(S_0 - V.t)^2 + D^2]^{1/2}}{r_{max}} \quad (10.13)$$

$$r_t = -V\frac{S_0 - V.t}{r.r_{max}^2} \quad (10.14)$$

$$r_x = \frac{(S_0 - V.t)\cos\beta + D\text{sen}\beta}{r.r_{max}^2} \quad (10.15)$$

$$r_y = \frac{(S_0 - V.t)\text{sen}\beta - D\cos\beta}{r.r_{max}^2} \quad (10.16)$$

$$\phi_x = \frac{-r_y}{r} \tag{10.17}$$

$$\phi_y = \frac{r_x}{r} \tag{10.18}$$

$$\theta_t = \frac{VD}{(r.r_{max})^2} \tag{10.19}$$

$$\operatorname{sen}\phi = D\frac{(S_0 - V.t)\frac{\operatorname{sen}\beta}{D} - \cos\beta}{r.r_{max}} \tag{10.20}$$

$$\cos\phi = D\frac{(S_0 - V.t)\frac{\cos\beta}{D} + \operatorname{sen}\beta}{r.r_{max}} \tag{10.21}$$

$$u_r = -T_r.\operatorname{sen}\phi - R_r.\cos\phi \tag{10.22}$$

$$v_r = -R_r.\operatorname{sen}\phi + T_r.\cos\phi \tag{10.23}$$

Nas expressões acima, T e R são dados no texto (eqs. 3.2 a 3.4); T_r, R_r, T_z e R_z são as derivadas espaciais dessas componentes.