

$$\alpha_2 = \left(\frac{\partial \lambda_2}{\partial S_1} r_2^{(1)} + \frac{\partial \lambda_2}{\partial T} r_2^{(2)} \right)^{-1} \quad (1)$$

$$\begin{aligned} \alpha_2^{-1} &= \frac{\partial f_1}{\partial T} \left[\frac{\partial}{\partial S_1} \left(\frac{u_t}{\phi} \frac{(M_{t_1} f_1 + M_{t_2} f_2)}{\left[(M_{t_1} S_1 + M_{t_2} S_2) + \frac{(1-\phi)}{\phi} M_{t_s} \right]} \right) \right] \\ &+ \left(\frac{(M_{t_1} f_1 + M_{t_2} f_2)}{\left[(M_{t_1} S_1 + M_{t_2} S_2) + \frac{(1-\phi)}{\phi} M_{t_s} \right]} - \frac{\partial f_1}{\partial S_1} \right) \left[\frac{\partial}{\partial T} \left(\frac{u_t}{\phi} \frac{(M_{t_1} f_1 + M_{t_2} f_2)}{\left[(M_{t_1} S_1 + M_{t_2} S_2) + \frac{(1-\phi)}{\phi} M_{t_s} \right]} \right) \right] \end{aligned} \quad (2)$$

$$\begin{aligned} \alpha_2^{-1} &= \frac{\partial f_1}{\partial T} \left[\frac{\partial}{\partial S_1} \left(\frac{u_t}{\phi} \frac{(M_{t_1} f_1 + M_{t_2} (1-f_1))}{\left[(M_{t_1} S_1 + M_{t_2} (1-S_1)) + \frac{(1-\phi)}{\phi} M_{t_s} \right]} \right) \right] \\ &+ \left(\frac{(M_{t_1} f_1 + M_{t_2} (1-f_1))}{\left[(M_{t_1} S_1 + M_{t_2} (1-S_1)) + \frac{(1-\phi)}{\phi} M_{t_s} \right]} - \frac{\partial f_1}{\partial S_1} \right) \left[\frac{\partial}{\partial T} \left(\frac{u_t}{\phi} \frac{(M_{t_1} f_1 + M_{t_2} (1-f_1))}{\left[(M_{t_1} S_1 + M_{t_2} (1-S_1)) + \frac{(1-\phi)}{\phi} M_{t_s} \right]} \right) \right] \end{aligned} \quad (3)$$

$$\begin{aligned} \alpha_2^{-1} &= \frac{\partial f_1}{\partial T} \left[\frac{\partial}{\partial S_1} \left(\frac{u_t}{\phi} \frac{(M_{t_1} f_1 + M_{t_2} - M_{t_2} f_1)}{\left[(M_{t_1} S_1 + M_{t_2} - M_{t_2} S_1) + \frac{(1-\phi)}{\phi} M_{t_s} \right]} \right) \right] \\ &+ \left(\frac{(M_{t_1} f_1 + M_{t_2} - M_{t_2} f_1)}{\left[(M_{t_1} S_1 + M_{t_2} - M_{t_2} S_1) + \frac{(1-\phi)}{\phi} M_{t_s} \right]} - \frac{\partial f_1}{\partial S_1} \right) \left[\frac{\partial}{\partial T} \left(\frac{u_t}{\phi} \frac{(M_{t_1} f_1 + M_{t_2} - M_{t_2} f_1)}{\left[(M_{t_1} S_1 + M_{t_2} - M_{t_2} S_1) + \frac{(1-\phi)}{\phi} M_{t_s} \right]} \right) \right] \end{aligned} \quad (4)$$

$$\begin{aligned} \alpha_2^{-1} &= \frac{\partial f_1}{\partial T} \left[\frac{\partial}{\partial S_1} \left(\frac{u_t}{\phi} \frac{(f_1(M_{t_1} - M_{t_2}) + M_{t_2})}{\left[(S_1(M_{t_1} - M_{t_2}) + M_{t_2}) + \frac{(1-\phi)}{\phi} M_{t_s} \right]} \right) \right] \\ &\underbrace{\left(\frac{(f_1(M_{t_1} - M_{t_2}) + M_{t_2})}{S_1(M_{t_1} - M_{t_2}) + M_{t_2} + \frac{(1-\phi)}{\phi} M_{t_s}} - \frac{\partial f_1}{\partial S_1} \right) \left[\frac{\partial}{\partial T} \left(\frac{u_t}{\phi} \frac{(f_1(M_{t_1} - M_{t_2}) + M_{t_2})}{\left[(S_1(M_{t_1} - M_{t_2}) + M_{t_2}) + \frac{(1-\phi)}{\phi} M_{t_s} \right]} \right) \right]}_{II} \end{aligned} \quad (5)$$

derivando,

1. PARTE I:

$$\left[\frac{\partial}{\partial S_1} \left(\frac{u_t}{\phi} \frac{(f_1(M_{t_1} - M_{t_2}) + M_{t_2})}{\left[(S_1(M_{t_1} - M_{t_2}) + M_{t_2}) + \frac{(1-\phi)}{\phi} M_{t_s} \right]} \right) \right] \frac{\partial f_1}{\partial T} \quad (6)$$

$$\left(\frac{\left[\left(\frac{\partial f_1}{\partial S_1} (M_{t_1} - M_{t_2}) \right) \left(S_1(M_{t_1} - M_{t_2}) + M_{t_2} + \frac{(1-\phi)}{\phi} M_{t_s} \right) \right] - [(f_1(M_{t_1} - M_{t_2}) + M_{t_2})(M_{t_1} - M_{t_2})]}{\left[(S_1(M_{t_1} - M_{t_2}) + M_{t_2}) + \frac{(1-\phi)}{\phi} M_{t_s} \right]^2} \right) \frac{u_t}{\phi} \frac{\partial f_1}{\partial T} \quad (7)$$

1. PARTE II:

$$\left(\frac{(f_1(M_{t_1} - M_{t_2}) + M_{t_2})}{S_1(M_{t_1} - M_{t_2}) + M_{t_2} + \frac{(1-\phi)}{\phi} M_{t_s}} - \frac{\partial f_1}{\partial S_1} \right) \left[\frac{\partial}{\partial T} \left(\frac{u_t}{\phi} \frac{(f_1(M_{t_1} - M_{t_2}) + M_{t_2})}{\left[(S_1(M_{t_1} - M_{t_2}) + M_{t_2}) + \frac{(1-\phi)}{\phi} M_{t_s} \right]} \right) \right] \quad (8)$$

$$\left(\frac{u_t}{\phi} \frac{\left[\left(\frac{\partial f_1}{\partial T} (M_{t_1} - M_{t_2}) \right) \left(S_1(M_{t_1} - M_{t_2}) + M_{t_2} + \frac{(1-\phi)}{\phi} M_{t_s} \right) \right] - (f_1(M_{t_1} - M_{t_2}) + M_{t_2}) \cdot 0}{\left[(S_1(M_{t_1} - M_{t_2}) + M_{t_2}) + \frac{(1-\phi)}{\phi} M_{t_s} \right]^2} \right) \left(\frac{(f_1(M_{t_1} - M_{t_2}) + M_{t_2})}{S_1(M_{t_1} - M_{t_2}) + M_{t_2} + \frac{(1-\phi)}{\phi} M_{t_s}} - \frac{\partial f_1}{\partial S_1} \right) \quad (9)$$

$$\left(\frac{u_t}{\phi} \frac{\left[\left(\frac{\partial f_1}{\partial T} (M_{t_1} - M_{t_2}) \right) \left(S_1(M_{t_1} - M_{t_2}) + M_{t_2} + \frac{(1-\phi)}{\phi} M_{t_s} \right) \right]}{\left[(S_1(M_{t_1} - M_{t_2}) + M_{t_2}) + \frac{(1-\phi)}{\phi} M_{t_s} \right]^2} \right) \left(\frac{(f_1(M_{t_1} - M_{t_2}) + M_{t_2})}{S_1(M_{t_1} - M_{t_2}) + M_{t_2} + \frac{(1-\phi)}{\phi} M_{t_s}} - \frac{\partial f_1}{\partial S_1} \right) \quad (10)$$

1. JUNTANDO PARTE I E PARTE II:

$$\alpha_2^{-1} = \left(\frac{\left[\left(\frac{\partial f_1}{\partial S_1} (M_{t_1} - M_{t_2}) \right) \left(S_1(M_{t_1} - M_{t_2}) + M_{t_2} + \frac{(1-\phi)}{\phi} M_{t_s} \right) \right] - [(f_1(M_{t_1} - M_{t_2}) + M_{t_2})(M_{t_1} - M_{t_2})]}{\left[(S_1(M_{t_1} - M_{t_2}) + M_{t_2}) + \frac{(1-\phi)}{\phi} M_{t_s} \right]^2} \right) \frac{u_t}{\phi} \frac{\partial f_1}{\partial T} + \left(\frac{u_t}{\phi} \frac{\left[\left(\frac{\partial f_1}{\partial T} (M_{t_1} - M_{t_2}) \right) \left(S_1(M_{t_1} - M_{t_2}) + M_{t_2} + \frac{(1-\phi)}{\phi} M_{t_s} \right) \right]}{\left[(S_1(M_{t_1} - M_{t_2}) + M_{t_2}) + \frac{(1-\phi)}{\phi} M_{t_s} \right]^2} \right) \left(\frac{(f_1(M_{t_1} - M_{t_2}) + M_{t_2})}{S_1(M_{t_1} - M_{t_2}) + M_{t_2} + \frac{(1-\phi)}{\phi} M_{t_s}} - \frac{\partial f_1}{\partial S_1} \right) \quad (11)$$

$$\frac{dS}{d\xi} = \frac{\partial f_1}{\partial T} \alpha_2$$

$$\frac{dT}{d\xi} = \left(\frac{(M_{t_1} f_1 + M_{t_2} f_2)}{\left[(M_{t_1} S_1 + M_{t_2} S_2) + \frac{(1-\phi)}{\phi} M_{t_s} \right]} - \frac{\partial f_1}{\partial S_1} \right) \alpha_2$$

$$\frac{dT}{dS} = \frac{\left(\frac{(M_{t_1} f_1 + M_{t_2} f_2)}{\left[(M_{t_1} S_1 + M_{t_2} S_2) + \frac{(1-\phi)}{\phi} M_{t_s} \right]} - \frac{\partial f_1}{\partial S_1} \right) \alpha_2}{\frac{\partial f_1}{\partial T} \alpha_2}$$

$$\frac{dT}{dS} = \frac{\frac{(M_{t_1} f_1 + M_{t_2} f_2)}{\left[(M_{t_1} S_1 + M_{t_2} S_2) + \frac{(1-\phi)}{\phi} M_{t_s} \right]} - \frac{\partial f_1}{\partial S_1}}{\frac{\partial f_1}{\partial T}}$$