1) $\hat{x}_{k+1|k} = \hat{x}_{k|k}$ $\quad$ $\Gamma_{k+1|k} = \Gamma_{k|k} + \Gamma_\alpha$

$$\hat{x}_{k|k} = \hat{x}_{k|k-1} + K_k \tilde{y}_k$$

$$\Gamma_{k|k} = (1 - K_k)\,\Gamma_{k|k-1}$$

$$\tilde{y}_k = y_k - \hat{x}_{k|k-1}$$

$$S_k = \Gamma_{k|k-1} + \Gamma_\beta$$

$$K_k = \Gamma_{k|k-1}\, S_k^{-1}$$

$$\hat{x}_{k+1/k} = \hat{x}_{k|k-1} + \frac{\Gamma_{k|k-1}}{\Gamma_{k|k-1} + \underbrace{\Gamma_\beta}_{3}} \left(y_k - \hat{x}_{k|k-1} \right)$$

$$\Gamma_{k+1|k} = \left(1 - \frac{\Gamma_{k|k-1}}{\Gamma_{k|k-1} + \underbrace{\Gamma_\beta}_{3}} \right) \Gamma_{k|k-1} + \underbrace{\Gamma_\alpha}_{4}$$

2) $\Gamma_{k+1|k} = \Gamma_{k|k-1} = \Gamma_\infty$

$$\Gamma_\infty = \left(1 - \frac{\Gamma_\infty}{\Gamma_\infty + 3}\right)\Gamma_\infty + 4$$

$$\Rightarrow \Gamma_\infty = \Gamma_\infty - \frac{\Gamma_\infty^2}{\Gamma_\infty + 3} + 4$$

$$\Rightarrow \Gamma_\infty^2 = 4 \times (\Gamma_\infty + 3)$$

$$\Rightarrow \Gamma_\infty^2 - 4\,\Gamma_\infty - 12 = 0$$

$$\Rightarrow \Gamma_\infty = \frac{4 \pm \sqrt{16 + 4 \times 12}}{2} = 6 \ (\text{ou } -2)$$

donc $$\hat{x}_{k+1} = \hat{x}_k + \frac{2}{3}\left(y_k - \hat{x}_k\right)$$

3) si $\Gamma_\alpha = 0$ alors $\Gamma_\infty^2 = 0$ donc $\Gamma_\infty = 0$

et donc $\hat{x}_{k+1} = \hat{x}_k$.

Il n'y a plus du tout d'incertitude.
On a la température exacte au bout d'un certain temps.