

Identify each component

appVersion(4) = "0.98.6179.21440"

$$\left\{\begin{array}{l} \rho_a := 7850 \\ \alpha_c := 25 \\ \sigma := \frac{5,67}{10^8} \end{array}\right. \quad ?$$

$$\left\{\begin{array}{l} \phi := 1,0 \\ \varepsilon_m := 0,7 \\ \varepsilon_f := 1,0 \end{array}\right. \quad ?$$

$k_{sh} = 0,5888$

$$\left\{\begin{array}{l} ratio_{Am,b_v} := 70 \cdot 10^2 \\ ratio_{Am_v} := 107 \cdot 10^2 \\ k_{sh} := 0,9 \cdot \frac{ratio_{Am,b_v}}{ratio_{Am_v}} \end{array}\right. \quad ?$$

appVersion(-4) = "0.98.6179.21440"

appVersion(4) = "0.99.7610.506"

$$C_a := \left[\begin{array}{c} 425 + \frac{7,73}{10^1} \cdot \theta_a - \frac{1,69}{10^3} \cdot \theta_a^2 + \frac{2,22}{10^6} \cdot \theta_a^3 \\ 666 + \frac{13002}{738 - \theta_a} \\ 545 + \frac{17820}{\theta_a - 731} \\ 650 \end{array} \right]$$

system segments specifications

$$join := \left[\begin{array}{c} 0 \\ 24,36475 \\ 35,7945 \\ 54,7 \\ 120 \end{array} \right]$$

$$init := \left[\begin{array}{c} 20 \\ 600 \\ 735 \\ 900 \end{array} \right]$$

$$pts := \left[\begin{array}{c} 200 \\ 100 \\ 100 \\ 1000 \end{array} \right]$$

original 24.4 ... 35.8

t0 := time(1)

collect the piecewise DE ... export vector algo style d(t,θ.a)

for i ∈ [1..length(C_a)]

$$d_i := \frac{k_{sh}}{C_{a_i} \cdot \rho_a} \cdot ratio_{Am_v} \cdot \left(\alpha_c \cdot (\theta_g(t) - \theta_a) + \phi \cdot \varepsilon_m \cdot \varepsilon_f \cdot \sigma \cdot \left((\theta_g(t))^4 - \theta_a^4 \right) \right)$$

$$d(t; \theta_a) := d$$

solving vector

collect the piecewise DE solutions from incremented "for loop"

(s := 1) = "auto-incrementing counter, accumulates sols in Res[s]"

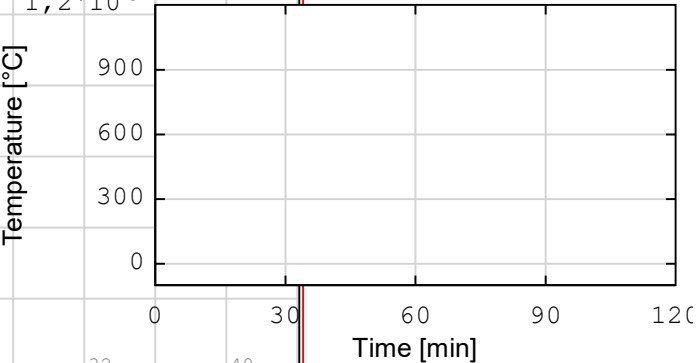
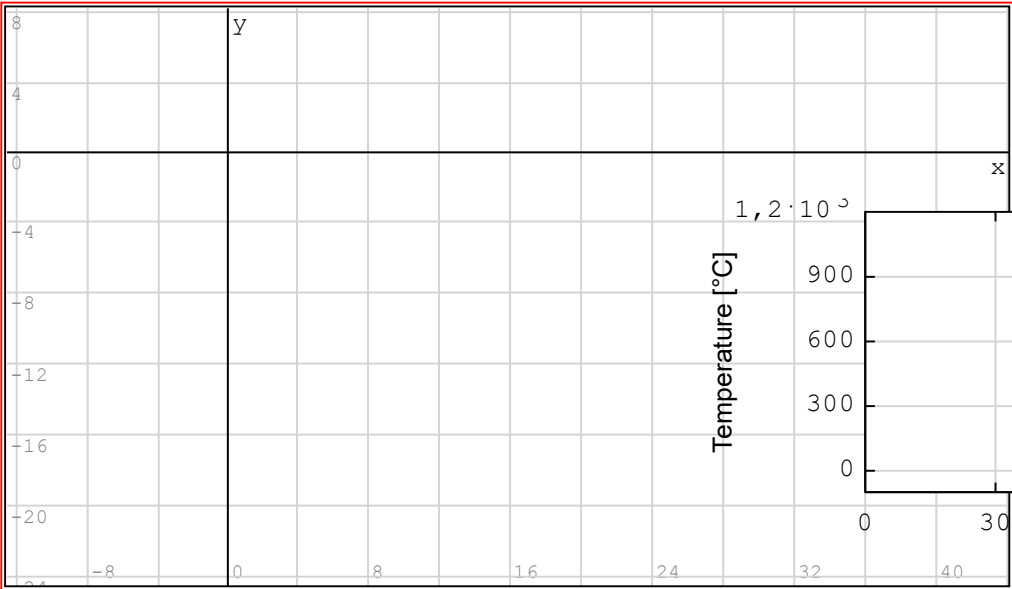
for i ∈ [2..length(join)]

$$Res_s := dn_GearsBDF \left(init_s; join_s; join_i; pts_s; d(t; \theta_a)_s \right)$$

s := s + 1

time(1) - t0 = 0

$$plot := \left\{ \begin{array}{l} Res_1 \\ Res_2 \\ Res_3 \\ Res_4 \\ "" \\ \theta_g(x) \\ join_1 \leq x \leq join_5 \end{array} \right.$$



$d\left(t;\theta_a\right)=\left[\frac{822875976562500000\cdot\left(2500000000000\cdot\left(5\cdot\left(4+69\cdot\log_{10}\left(1+8\cdot t\right)\right)-\theta_a\right)+3969\cdot\left(625\cdot\left(4+69\cdot\log_{10}\left(1+8\cdot t\right)\right)^4-\theta_a^4\right)\right)}{20506591796875\cdot\left(500000000000\cdot\left(100\cdot\left(425000+773\cdot\theta_a\right)-169\cdot\theta_a^2\right)+111000000000\cdot\theta_a^3\right)}\right.\\ \frac{21\cdot\left(738-\theta_a\right)\cdot\left(2500000000000\cdot\left(5\cdot\left(4+69\cdot\log_{10}\left(1+8\cdot t\right)\right)-\theta_a\right)+3969\cdot\left(625\cdot\left(4+69\cdot\log_{10}\left(1+8\cdot t\right)\right)^4-\theta_a^4\right)\right)}{15700000000000\cdot\left(2167+111\cdot\left(738-\theta_a\right)\right)}\\ \frac{63\cdot\left(-731+\theta_a\right)\cdot\left(2500000000000\cdot\left(5\cdot\left(4+69\cdot\log_{10}\left(1+8\cdot t\right)\right)-\theta_a\right)+3969\cdot\left(625\cdot\left(4+69\cdot\log_{10}\left(1+8\cdot t\right)\right)^4-\theta_a^4\right)\right)}{39250000000000\cdot\left(3564+109\cdot\left(-731+\theta_a\right)\right)}\\ \left.\frac{63\cdot\left(2500000000000\cdot\left(5\cdot\left(4+69\cdot\log_{10}\left(1+8\cdot t\right)\right)-\theta_a\right)+3969\cdot\left(625\cdot\left(4+69\cdot\log_{10}\left(1+8\cdot t\right)\right)^4-\theta_a^4\right)\right)}{510250000000000}\right]$