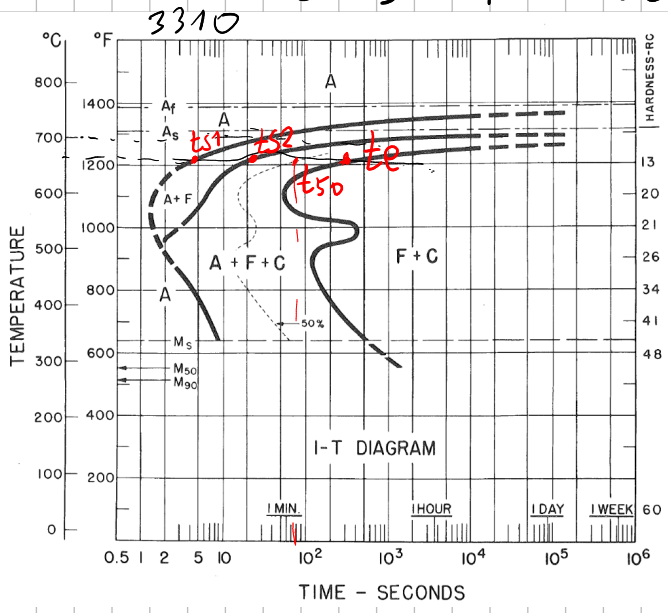
Python в инженерных расчетах

Практическое занятие # 13

SciPy.optimize.fsolve



Дано:

$t_{s1} = 3{,}375$ с

$t_{s2} = 14{,}5$ с

$t_{50} = 47{,}86$ с

$t_e = 324{,}99$ с

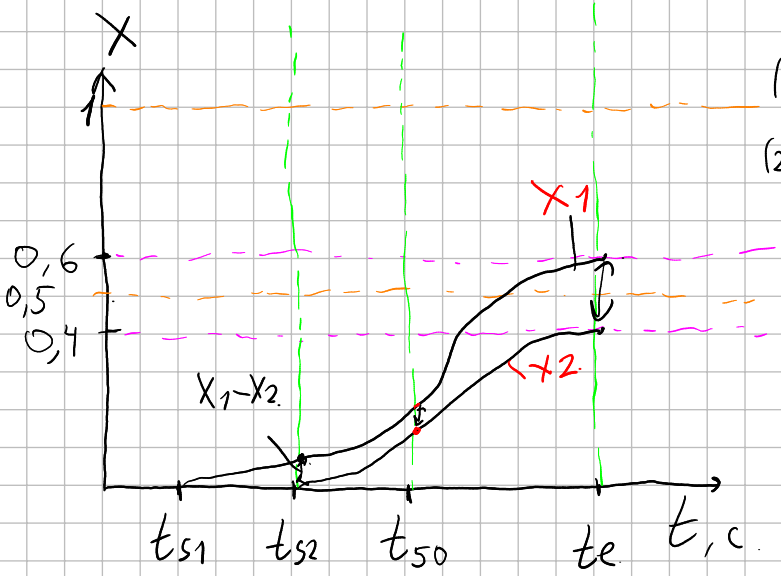
$$X_1 = 1 - e^{\left(\left(-\frac{1}{b_1}\right)\cdot(t-t_{s1})^{n_1}\right)}$$

$$X_2 = 1 - e^{\left(\left(-1/b_2\right)\cdot(t-t_{s2})^{n_2}\right)}$$

(1) $X_1(t_e) + X_2(t_e) = 1$

(2) $X_1(t_{50}) + X_2(t_{50}) = 0{,}5$

$X_1 - X_2 = const$



Уравнение 1: $\underbrace{\left(1 - e^{(-1/b_1)\cdot(t_e - t_{s1})^{n_1}}\right)}_{X_1} + \underbrace{\left(1 - e^{(-1/b_2)\cdot(t_e - t_{s2})^{n_2}}\right)}_{X_2} = 1$

Уравнение 2: $\left(1 - e^{(-1/b_1)\cdot(t_{50} - t_{s1})^{n_1}}\right) + \left(1 - e^{(-1/b_2)\cdot(t_{50} - t_{s2})^{n_2}}\right) = 0{,}5$

Уравнение 3:

$$\underbrace{\left(1 - e^{(-1/b_1)\cdot(t_e - t_{s1})}\right)}_{X} - \underbrace{\left(1 - e^{(-1/b_2)\cdot(t_e - t_{s2})^{n_2}}\right)}_{X_2} = \left(1 - e^{(-1/b_1)(t_{s2} - t_{s1})^{n_1}}\right)$$

$n = [1 \ldots 4]$ $\quad n_1 = n_2$