$A_p := 0.2 \quad P_{atm} := 1 \quad L := 0.04 \quad V := 2 \quad W_s := 0.300$

$O_{2o} := 21.0 \quad V_{m1} := 22.71 \quad K_{m1} := 7.63 \quad K_{i1} := 14.42 \quad P_{O2} := 0.2$

$CO_{2o} := 0.03 \quad V_{m2} := 17.64 \quad K_{m2} := 5.08 \quad K_{i2} := 11.99 \quad P_{CO2} := 0.2$

$$D_1(t, o) := \frac{1}{V} \cdot \left(\frac{A_p \cdot P_{O2} \cdot P_{atm}}{L} \cdot \left(0.01 \cdot \left(O_{2o} - o \right) \right) - W_s \cdot r_{O2} \right)$$

100 replaced with 1

$$D_2(t, co) := \frac{1}{V} \cdot \left(\frac{A_p \cdot P_{CO2} \cdot P_{atm}}{L} \cdot \left(0.01 \cdot \left(CO_{2o} - co \right) \right) + W_s \cdot r_{CO2} \right)$$

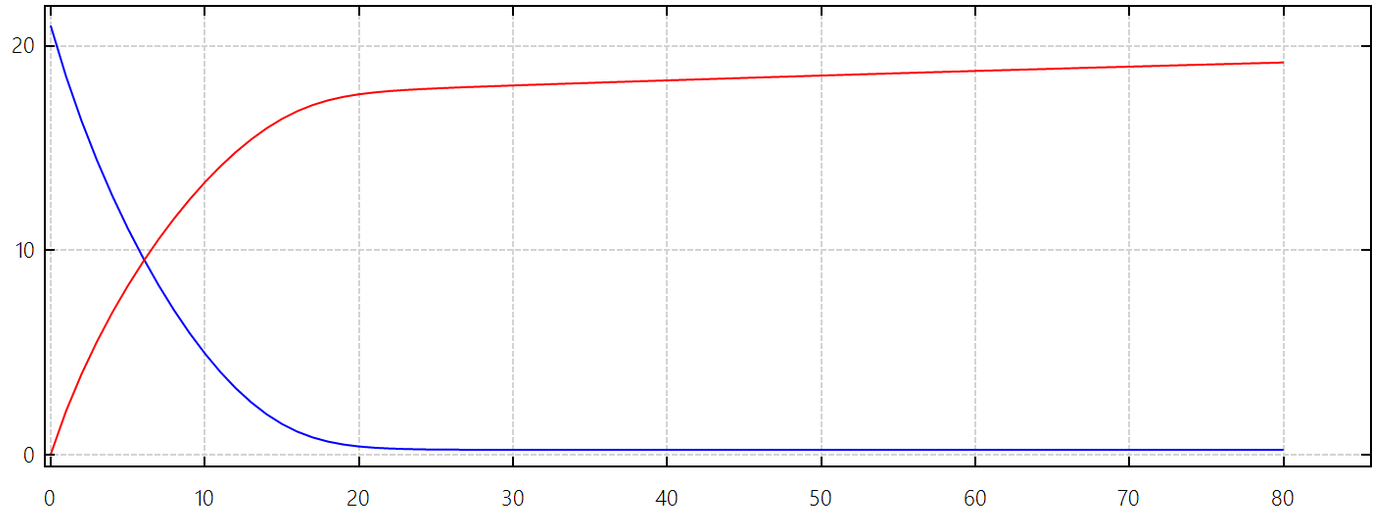
$$r\left(O_{2i}, CO_{2i}, V_m, K_m, K_i\right) := V_m \cdot O_{2i} \cdot \left(K_m + \left(1 + \frac{CO_{2i}}{K_i} \right) \cdot O_{2i} \right)^{-1}$$

$oco_0 := \text{stack}(21.0, 0.03) \quad t_{min} := 0 \quad t_{max} := 80 \quad steps := 80$

$oco :=$
- $\left[O_{2i} \;\; CO_{2i} \right] := oco_0^{\,T}$
- $t := t_{min}$
- $\Delta t := \left(t_{max} - t_{min} \right) \cdot steps^{-1}$
- $out := \left[t \;\; O_{2i} \;\; CO_{2i} \right]$
- for $n \in [1..steps]$
  - $r_{O2} := r\left(O_{2i}, CO_{2i}, V_{m1}, K_{m1}, K_{i1}\right)$
  - $r_{CO2} := r\left(O_{2i}, CO_{2i}, V_{m2}, K_{m2}, K_{i2}\right)$
  - $O_{2i} := \text{rkfixed}\left(O_{2i}, t, t + \Delta t, 1, D_1\right)_{2\,2}$
  - $CO_{2i} := \text{rkfixed}\left(CO_{2i}, t, t + \Delta t, 1, D_2\right)_{2\,2}$
  - $t := t + \Delta t$
  - $out := \text{stack}\left(out, \left[t \;\; O_{2i} \;\; CO_{2i} \right]\right)$
- out

$O_{2i} := \text{augment}\left(\text{col}(oco, 1), \text{col}(oco, 2)\right)$

$CO_{2i} := \text{augment}\left(\text{col}(oco, 1), \text{col}(oco, 3)\right)$



O_{2i}

CO_{2i}