

ORIGIN := 0

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Euler(f, g, h, a, b, s0, i0, r0, n, m0, ms, p, m) :=
  Δ ← (b - a) / n
  s0 ← s0
  i0 ← i0
  r0 ← r0
  for k ∈ 0..n
    t_k ← a + Δ · k
    e_k ← m(t_k)
    B_k ← e_k · p
  for k ∈ 0..n-1
    s_{k+1} ← s_k + Δ · f(t_k, s_k, i_k, r_k)
    i_{k+1} ← i_k + Δ · g(t_k, s_k, i_k, r_k)
    r_{k+1} ← r_k + Δ · h(t_k, s_k, i_k, r_k)
  z ← augment(t, s, i, r)
  z
```

Euler(

$N := 40000$ $n := 100$ $m0 := 5$ $p := 0.2$ $D := 13$ $\gamma := \frac{1}{D}$

$ms := 1$

$m(t) := \frac{m0 - ms}{1 + e^{10(t-10)}} + ms$

$$B(t) := m(t) \cdot p$$

$$f(t, S, I, R) := -B(t) \cdot I \cdot \frac{S}{N} \quad s0 := N - n$$

$$g(t, S, I, R) := B(t) \cdot I \cdot \frac{S}{N} - \gamma \cdot I \quad i0 := n$$

$$h(t, S, I, R) := \gamma \cdot I \quad r0 := 0$$

$$a := 0 \quad b := 100$$

$$Q := \text{Euler}(f, g, h, a, b, s0, i0, r0, n, m0, ms, p, m)$$

$$t := Q^{(0)}$$

$$S := Q^{(1)}$$

$$I := Q^{(2)}$$

$$R := Q^{(3)}$$

S

I

R



