



# Differential Equation System

## “CONSTANT LACTONASE PRODUCTION”

### 1 Rate Laws

#### 1.1 Reaction: re14

$$v_1 = [s_6] \cdot k_{T_7} \cdot [s_{45}] \quad (1)$$

#### 1.2 Reaction: re15

$$v_2 = k \cdot ([s_{46}] + [s_{49}]) \quad (2)$$

#### 1.3 Reaction: re19

$$v_3 = d \cdot [s_{32}] \quad (3)$$

#### 1.4 Reaction: re21

$$v_4 = d \cdot [s_{47}] \quad (4)$$

#### 1.5 Reaction: re22

$$v_5 = k \cdot [s_{47}] - k \cdot [s_{46}] \quad (5)$$

#### 1.6 Reaction: re23

$$v_6 = d \cdot [s_{46}] \quad (6)$$

#### 1.7 Reaction: re24

$$v_7 = k \cdot [s_{10}] \cdot [s_{47}] - k \cdot [s_{49}] \quad (7)$$

#### 1.8 Reaction: re25

$$v_8 = d \cdot [s_{49}] \quad (8)$$

### 2 Equations

#### 2.1 Species: s6 (pT7)

$$\frac{d[s_6]}{dt} = 0 \quad (9)$$

**2.2 Species: s8 (transcription)**

$$\frac{d[s_8]}{dt} = -v_1 \quad (10)$$

**2.3 Species: s10 (mRNA\_RIBOKEY)**

$$\frac{d[s_{10}]}{dt} = -v_7 \quad (11)$$

**2.4 Species: s16 (translation)**

$$\frac{d[s_{16}]}{dt} = -v_2 \quad (12)$$

**2.5 Species: s32 (lactonase)**

$$\frac{d[s_{32}]}{dt} = -v_3 + v_2 \quad (13)$$

**2.6 Species: s33 (sa30\_degraded)**

$$\frac{d[s_{33}]}{dt} = v_3 \quad (14)$$

**2.7 Species: s37 (sa10\_degraded)**

$$\frac{d[s_{37}]}{dt} = v_4 \quad (15)$$

**2.8 Species: s38 (sa18\_degraded)**

$$\frac{d[s_{38}]}{dt} = v_6 \quad (16)$$

**2.9 Species: s42 (csa3\_degraded)**

$$\frac{d[s_{42}]}{dt} = v_8 \quad (17)$$

**2.10 Species: s45 (Gene lactonase)**

$$\frac{d[s_{45}]}{dt} = 0 \quad (18)$$

**2.11 Species: s46 (open\_mRNA\_lactonase)**

$$\frac{d[s_{46}]}{dt} = -v_6 + v_5 \quad (19)$$

**2.12 Species: s47 (gesloten\_mRNA\_lactonase)**

$$\frac{d[s_{47}]}{dt} = -v_7 - v_5 - v_4 + v_1 \quad (20)$$

**2.13 Species: s49 (open\_mRNA\_lactonase\_complex)**

$$\frac{d[s_{49}]}{dt} = -v_8 + v_7 \quad (21)$$

### 2.14 Species: s50 (mRNA\_RIBOKEY)

$$\frac{d[s_{50}]}{dt} = 0 \quad (22)$$

### 2.15 Species: s51 (gesloten\_mRNA\_lactonase)

$$\frac{d[s_{51}]}{dt} = 0 \quad (23)$$

## 3 Species

Species	Initial concentration	compartment
$s_6$	10.0	default
$s_8$	0.0	default
$s_{10}$	0.0	default
$s_{16}$	0.0	default
$s_{32}$	0.0	default
$s_{33}$	0.0	default
$s_{37}$	0.0	default
$s_{38}$	0.0	default
$s_{42}$	0.0	default
$s_{45}$	1.0	default
$s_{46}$	0.0	default
$s_{47}$	0.0	default
$s_{49}$	0.0	default
$s_{50}$	4.9E-324	
$s_{51}$	4.9E-324	

## 4 Compartments

Compartment	Volume
<i>default</i>	1.0