Aufgabe 1

$p_O := 0 \wedge p_D := 0$

l_0
$\dot{p_o} = v_0$
$\dot{p_D} \in [-v_D, v_D]$
$p_O - p_D < 3$
$p_D - p_O < 3$

$p_O - p_D = 3$

l_1
$\dot{p_O} = 0$
$\dot{p_D} \in [0, v_D]$
$p_O - p_D = 3$

$p_D - p_O = 3$

$p_O - p_D < 3$

$p_O - p_D = 0$

$p_O - p_D < 3$

$p_O - p_D = 3$

l_2
$\dot{p_O} = v_0$
$\dot{p_D} \in [-v_D, 0]$
$p_D - p_0 = 3$

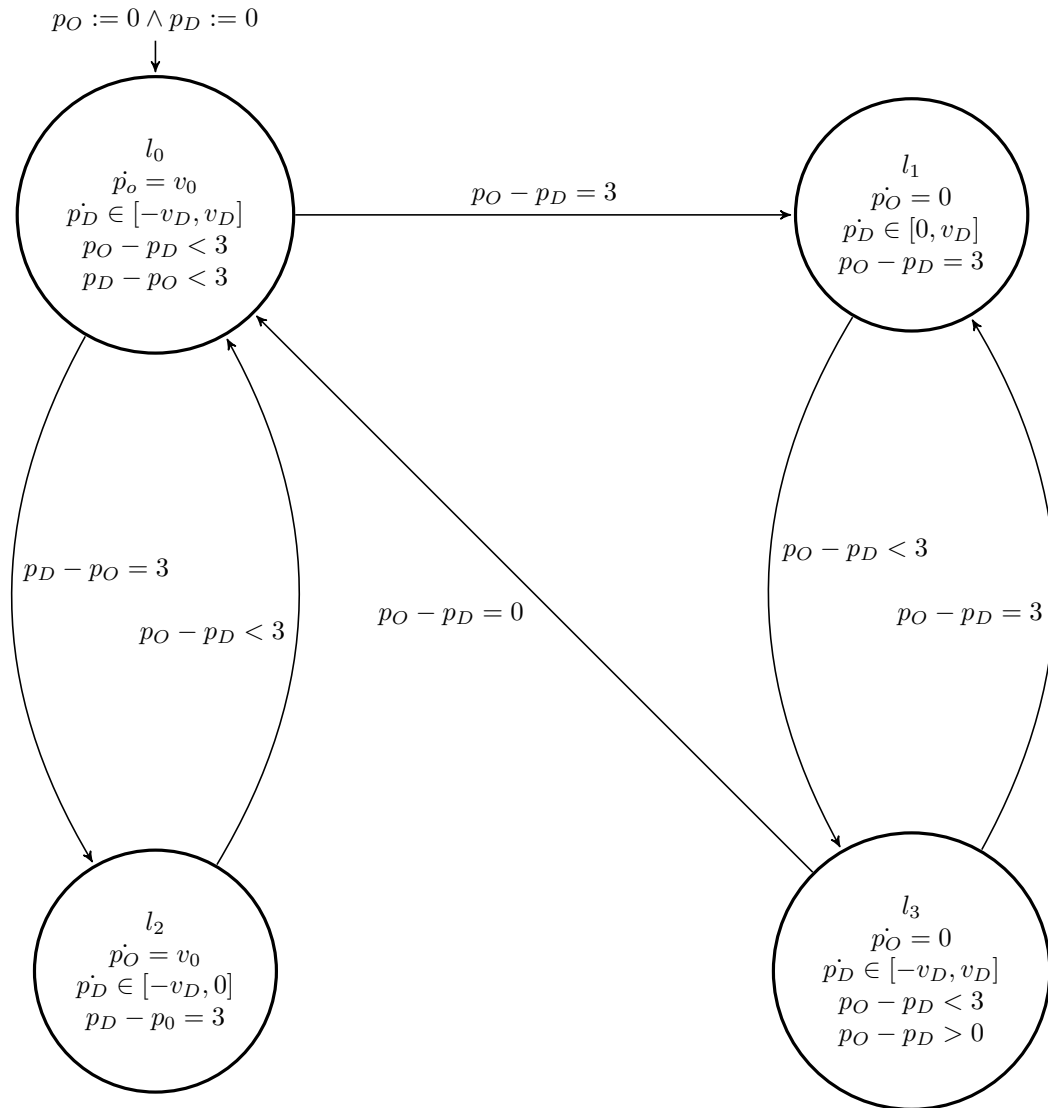l_3
$\dot{p_O} = 0$
$\dot{p_D} \in [-v_D, v_D]$
$p_O - p_D < 3$
$p_O - p_D > 0$

Aufgabe 2

$$R_1 = T_L^+(R_0) = (l_0, \exists t. \exists x_{pre}. \exists y_{pre}. t \geq 0 \wedge x = x_{pre} \wedge x_{pre} \in R_0 \wedge y = y_{pre} + t \wedge y_{pre} \in R_0 \wedge x + y \leq 4)$$
$$= (l_0, \exists t. \exists x_{pre}. \exists y_{pre}. t \geq 0 \wedge x = x_{pre} \wedge y = y_{pre} + t \wedge x + y \leq 4 \wedge x_{pre} = y_{pre} = 0)$$
$$= (l_0, \exists t. t \geq 0 \wedge x = 0 \wedge y = t \wedge x + y \leq 4)$$
$$= (l_0, \exists t. t \geq 0 \wedge x = 0 \wedge y = t \wedge y \leq 4)$$

$$R_2 = D_L^+(R_1) = (l_1, \exists x_{pre}. \exists y_{pre}. x_{pre} \in R_1 \wedge y_{pre} \in R_1 \wedge x \leq 3 \wedge x = x_{pre} \wedge y = y_{pre})$$
$$= (l_1, \exists t. \exists x_{pre}. \exists y_{pre}. t \geq 0 \wedge x = x_{pre} \wedge y = y_{pre} \wedge x \leq 3 \wedge y_{pre} \leq 4 \wedge x_{pre} = 0 \wedge y = t)$$
$$= (l_1, \exists t. t \geq 0 \wedge x = 0 \wedge y \leq 4 \wedge y = t)$$
$$= (l_1, x = 0 \wedge y \leq 4)$$

$$R_3 = T_L^+(R_2) = (l_1, \exists t. \exists x_{pre}. \exists y_{pre}. t \geq 0 \wedge x_{pre} \in R_2 \wedge y_{pre} \in R_2 \wedge x = x_{pre} + t \wedge y = y_{pre} + t \wedge x \leq 3)$$
$$= (l_1, \exists t. \exists x_{pre}. \exists y_{pre}. t \geq 0 \wedge x_{pre} = 0 \wedge y_{pre} \leq 4 \wedge x = x_{pre} + t \wedge y = y_{pre} + t \wedge x \leq 3)$$
$$= (l_1, \exists t. t \geq 0 \wedge x = t \wedge y \leq 4 + t \wedge x \leq 3)$$

$$R_4 = D_L^+(R_3) = (l_0, \exists x_{pre}. \exists y_{pre}. x_{pre} \in R_3 \wedge y_{pre} \in R_3 \wedge x = 0 \wedge y = 0 \wedge x + y \leq 4)$$
$$= (l_0, \exists t. \exists x_{pre}. \exists y_{pre}. t \geq 0 \wedge x_{pre} = t \wedge y_{pre} \leq 4 + t \wedge x = 0 \wedge y = 0 \wedge x + y \leq 4)$$
$$= (l_0, \exists t. t \geq 0 \wedge x = 0 \wedge y = 0)$$
$$= (l_0, x = 0 \wedge y = 0)$$

$$P_2 = \{R_4\} = \{(l_0, x = 0 \wedge y = 0)\}$$