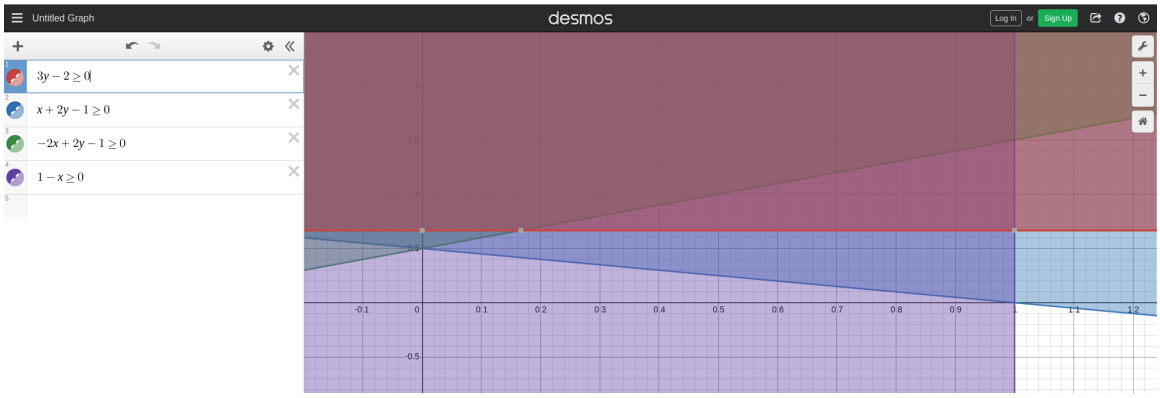
Phase 1

Iteration 1

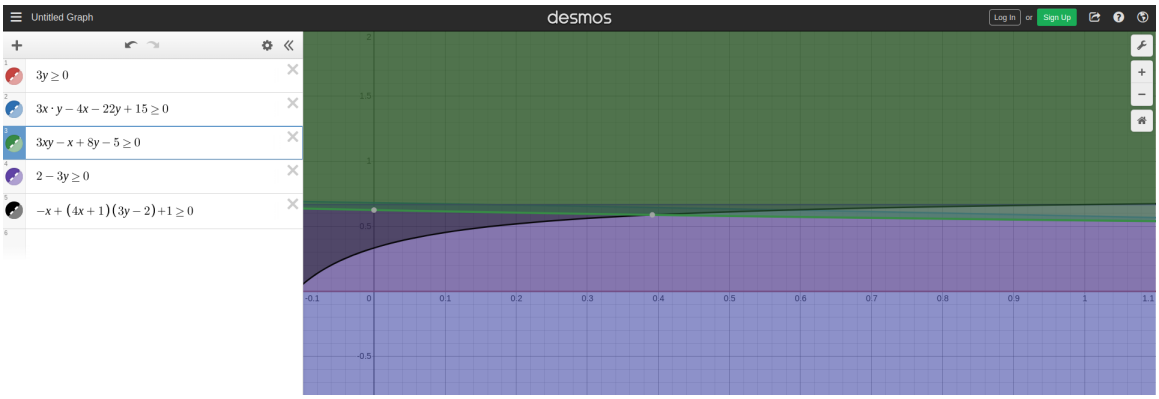
	w_1	w_2	w_3	w_4	w_5	w_6	z_1	z_2	z_3	z_4	z_5	z_6	
w_1	1	0	0	0	0	0	0	0	0	1	0	0	3
w_2	0	1	0	0	0	0	0	0	0	0	1	0	2
w_3	0	0	1	0	0	0	0	0	0	0	-1	0	$3x_{12} - 2$
w_4	0	0	0	1	0	0	-1	0	0	$-2x_{11} - 1$	$x_{11} + 2$	$-2x_{11} - 1$	$x_{11} + 2x_{12} - 1$
w_5	0	0	0	0	1	0	0	-1	1	$x_{11} + 2$	$x_{11} - 8$	$4x_{11} + 1$	$-2x_{11} + 2x_{12} - 1$
w_6	0	0	0	0	0	1	0	0	0	$-2x_{11} - 1$	$4x_{11} + 1$	$-2x_{11} - 2$	$1 - x_{11}$



Perform exchange pivot for $w_3 \to z_3$ and $w_5 \to z_5$.

Iteration 2

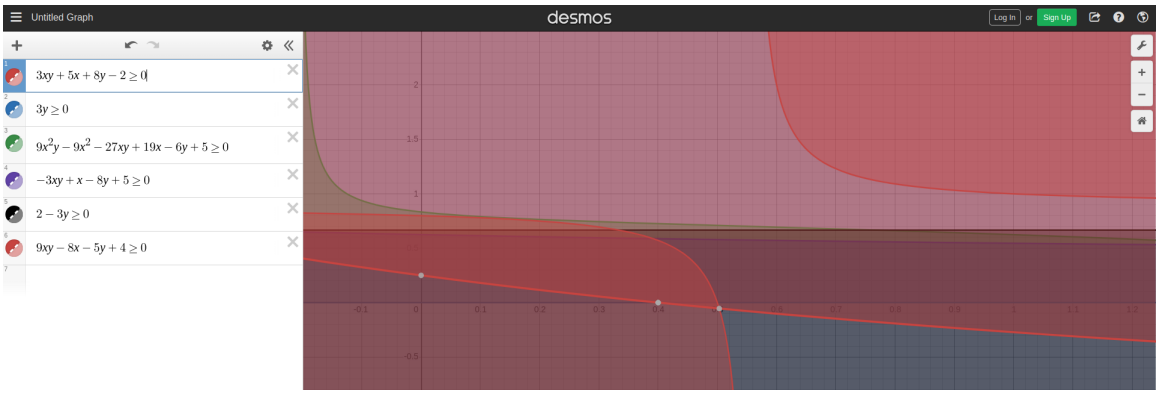
	w_1	w_2	w_3	w_4	w_5	w_6	z_1	z_2	z_3	z_4	z_5	z_6	
w_1	1	0	0	0	0	0	0	0	0	1	0	0	3
w_2	0	1	1	0	0	0	0	0	0	0	0	0	$3x_{12}$
z_3	0	0	$x_{11} - 8$	0	1	0	0	-1	1	$x_{11} + 2$	0	$4x_{11} + 1$	$3x_{11}x_{12} - 4x_{11} - 22x_{12} + 15$
w_4	0	0	$x_{11} + 2$	1	0	0	-1	0	0	$-2x_{11} - 1$	0	$-2x_{11} - 1$	$3x_{11}x_{12} - x_{11} + 8x_{12} - 5$
z_5	0	0	-1	0	0	0	0	0	0	0	1	0	$2 - 3x_{12}$
w_6	0	0	$4x_{11} + 1$	0	0	1	0	0	0	$-2x_{11} - 1$	0	$-2x_{11} - 2$	$-x_{11} + (4x_{11} + 1)(3x_{12} - 2) + 1$



Perform diagonal pivot for $w_4 \to z_4$.

Iteration 3

	w_1	w_2	w_3	w_4	w_5	w_6	z_1	z_2	z_3	z_4	z_5	z_6	
w_1	1	0	$\frac{x_{11}+2}{2x_{11}+1}$	$\frac{1}{2x_{11}+1}$	0	0	$-\frac{1}{2x_{11}+1}$	0	0	0	0	-1	$\frac{3x_{11}x_{12}+5x_{11}+8x_{12}-2}{2x_{11}+1}$
w_2	0	1	1	0	0	0	0	0	0	0	0	0	$3x_{12}$
z_3	0	0	$\frac{3x_{11}^2-11x_{11}-4}{2x_{11}+1}$	$\frac{x_{11}+2}{2x_{11}+1}$	1	0	$-\frac{x_{11}+2}{2x_{11}+1}$	-1	1	0	0	$3x_{11}-1$	$\frac{9x_{11}^2x_{12}-9x_{11}^2-27x_{11}x_{12}+19x_{11}-6x_{12}+5}{2x_{11}+1}$
z_4	0	0	$-\frac{x_{11}+2}{2x_{11}+1}$	$-\frac{1}{2x_{11}+1}$	0	0	$\frac{1}{2x_{11}+1}$	0	0	1	0	1	$\frac{-3x_{11}x_{12}+x_{11}-8x_{12}+5}{2x_{11}+1}$
z_5	0	0	-1	0	0	0	0	0	0	0	1	0	$2-3x_{12}$
w_6	0	0	$3x_{11}-1$	-1	0	1	1	0	0	0	0	-1	$9x_{11}x_{12}-8x_{11}-5x_{12}+4$

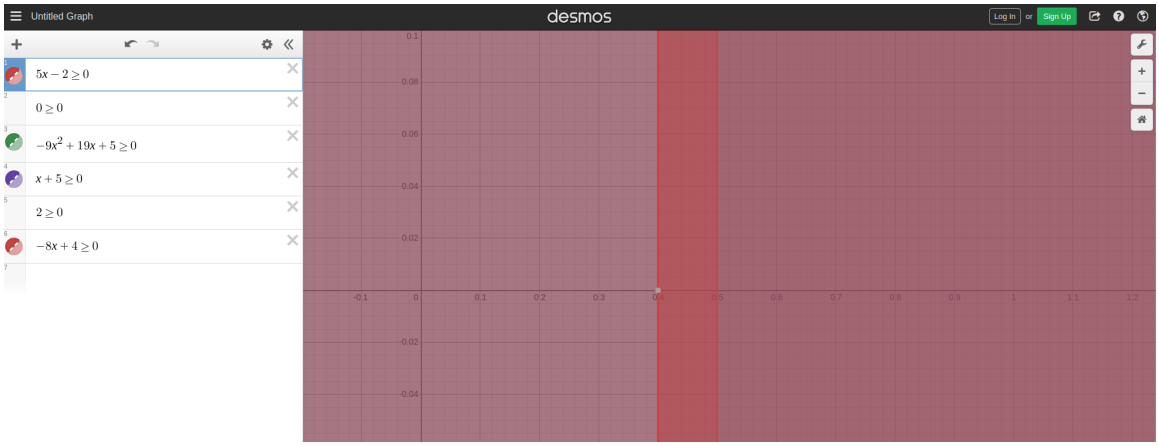


This region is valid for $0.4 \leq x_{11} \leq 0.5$ with $x_{12} = 0$, so we move to phase 2.

Phase 2

Iteration 1

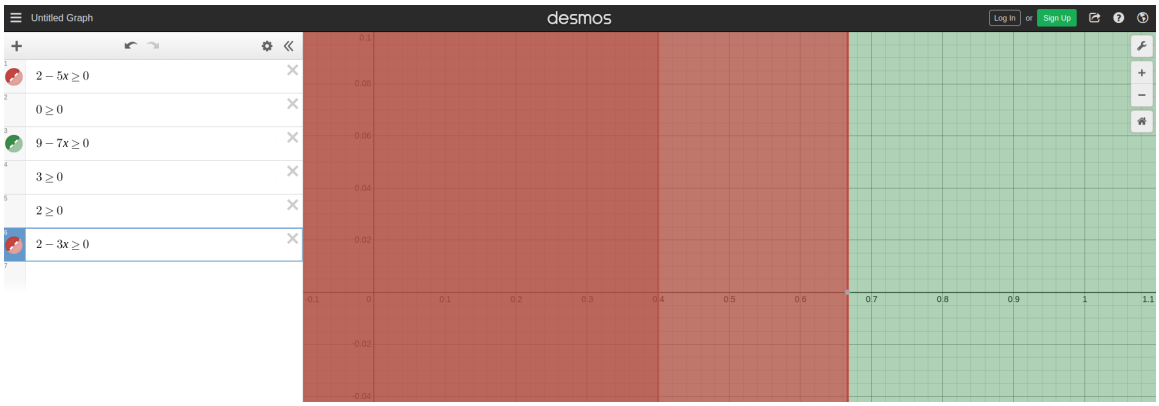
	w_1	w_2	w_3	w_4	w_5	w_6	z_1	z_2	z_3	z_4	z_5	z_6	
w_1	1	0	$\frac{x_{11}+2}{2x_{11}+1}$	$\frac{1}{2x_{11}+1}$	0	0	$-\frac{1}{2x_{11}+1}$	0	0	0	0	-1	$\frac{5x_{11}-2}{2x_{11}+1}$
w_2	0	1	1	0	0	0	0	0	0	0	0	0	0
z_3	0	0	$\frac{3x_{11}^2-11x_{11}-4}{2x_{11}+1}$	$\frac{x_{11}+2}{2x_{11}+1}$	1	0	$-\frac{x_{11}+2}{2x_{11}+1}$	-1	1	0	0	$3x_{11}-1$	$\frac{-9x_{11}^2+19x_{11}+5}{2x_{11}+1}$
z_4	0	0	$-\frac{x_{11}+2}{2x_{11}+1}$	$-\frac{1}{2x_{11}+1}$	0	0	$\frac{1}{2x_{11}+1}$	0	0	1	0	1	$\frac{x_{11}+5}{2x_{11}+1}$
z_5	0	0	-1	0	0	0	0	0	0	0	1	0	2
w_6	0	0	$3x_{11}-1$	-1	0	1	1	0	0	0	0	-1	$4-8x_{11}$



Perform diagonal pivot for $w_1 \to z_1$.

Iteration 2

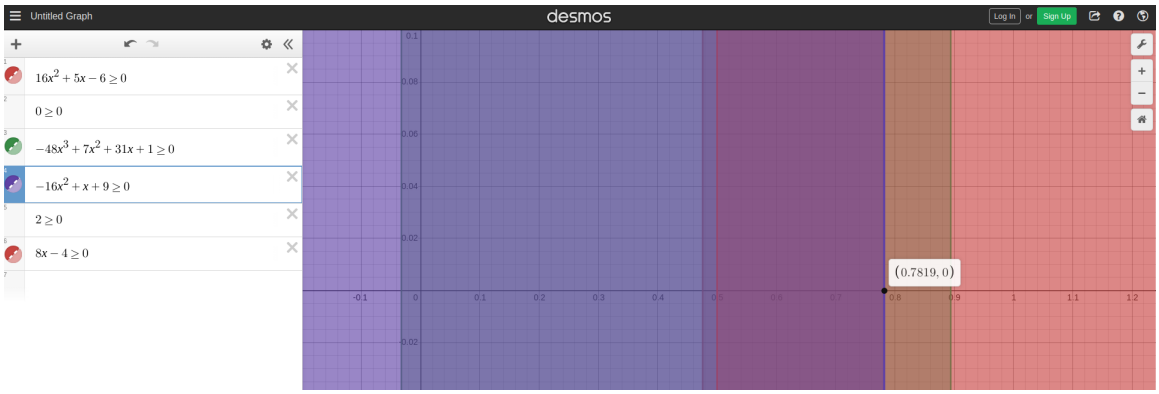
	w_1	w_2	w_3	w_4	w_5	w_6	z_1	z_2	z_3	z_4	z_5	z_6	
z_1	$-2x_{11}-1$	0	$-x_{11}-2$	-1	0	0	1	0	0	0	0	$2x_{11}+1$	$2-5x_{11}$
w_2	0	1	1	0	0	0	0	0	0	0	0	0	0
z_3	$-x_{11}-2$	0	$x_{11}-8$	0	1	0	0	-1	1	0	0	$4x_{11}+1$	$9-7x_{11}$
z_4	1	0	0	0	0	0	0	0	0	1	0	0	3
z_5	0	0	-1	0	0	0	0	0	0	0	1	0	2
w_6	$2x_{11}+1$	0	$4x_{11}+1$	0	0	1	0	0	0	0	0	$-2x_{11}-2$	$2-3x_{11}$



Solution is valid for $0 \leq x_{11} \leq 0.4$, so for iteration 3, return to tableau of iteration 1 and perform diagonal pivot for $w_6 \to z_6$.

Iteration 3

	w_1	w_2	w_3	w_4	w_5	w_6	z_1	z_2	z_3	z_4	z_5	z_6	
z_1	1	0	$\frac{3-6x_{11}^2}{2x_{11}+1}$	$\frac{2(x_{11}+1)}{2x_{11}+1}$	0	-1	$-\frac{2x_{11}+2}{2x_{11}+1}$	0	0	0	0	0	$\frac{16x_{11}^2+5x_{11}-6}{2x_{11}+1}$
w_2	0	1	1	0	0	0	0	0	0	0	0	0	0
z_3	0	0	$\frac{3\left(6x_{11}^3-5x_{11}-1\right)}{2x_{11}+1}$	$\frac{3-6x_{11}^2}{2x_{11}+1}$	1	$3x_{11}-1$	$\frac{3\left(2x_{11}^2-1\right)}{2x_{11}+1}$	-1	1	0	0	0	$\frac{-48x_{11}^3+7x_{11}^2+31x_{11}+1}{2x_{11}+1}$
z_4	0	0	$\frac{3\left(2x_{11}^2-1\right)}{2x_{11}+1}$	$-\frac{2x_{11}+2}{2x_{11}+1}$	0	1	$\frac{2(x_{11}+1)}{2x_{11}+1}$	0	0	1	0	0	$\frac{-16x_{11}^2+x_{11}+9}{2x_{11}+1}$
z_5	0	0	-1	0	0	0	0	0	0	0	1	0	2
z_6	0	0	$1-3x_{11}$	1	0	-1	-1	0	0	0	0	1	$8x_{11}-4$



Perform diagonal pivot for $z_4 \to w_4$.

Iteration 4

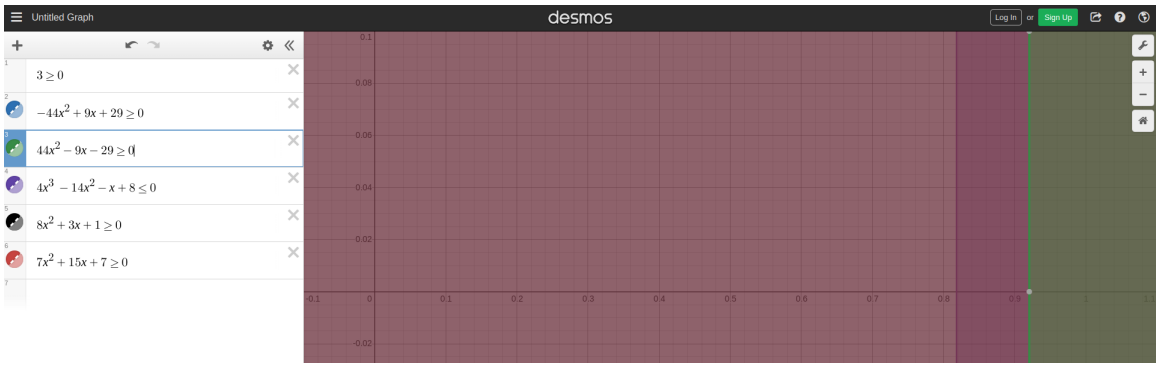
	w_1	w_2	w_3	w_4	w_5	w_6	z_1	z_2	z_3	z_4	z_5	z_6	
z_1	1	0	0	0	0	0	0	0	0	1	0	0	3
w_2	0	1	1	0	0	0	0	0	0	0	0	0	0
z_3	0	0	$\frac{3\left(6x_{11}^2-2x_{11}-5\right)}{2(x_{11}+1)}$	0	1	$\frac{4x_{11}+1}{2(x_{11}+1)}$	0	-1	1	$\frac{3\left(1-2x_{11}^2\right)}{2(x_{11}+1)}$	0	0	$\frac{-44x_{11}^2+9x_{11}+29}{2x_{11}+2}$
w_4	0	0	$\frac{3\left(1-2x_{11}^2\right)}{2(x_{11}+1)}$	1	0	$-\frac{x_{11}+\frac{1}{2}}{x_{11}+1}$	-1	0	0	$-\frac{x_{11}+\frac{1}{2}}{x_{11}+1}$	0	0	$\frac{16x_{11}^2-x_{11}-9}{2(x_{11}+1)}$
z_5	0	0	-1	0	0	0	0	0	0	0	1	0	2
z_6	0	0	$-\frac{4x_{11}+1}{2x_{11}+2}$	0	0	$-\frac{1}{2x_{11}+2}$	0	0	0	$\frac{x_{11}+\frac{1}{2}}{x_{11}+1}$	0	1	$\frac{9x_{11}+1}{2(x_{11}+1)}$

Perform diagonal pivot for $z_3 \to w_3$.

Iteration 5

	w_1	w_2	w_3	w_4	w_5	w_6	
z_1	1	0	0	0	0	0	
w_2	0	1	0	0	$\frac{2(x_{11}+1)}{3\left(-6x_{11}^2+2x_{11}+5\right)}$	$\frac{4x_{11}+1}{3\left(-6x_{11}^2+2x_{11}+5\right)}$	
w_3	0	0	1	0	$\frac{2(x_{11}+1)}{3\left(6x_{11}^2-2x_{11}-5\right)}$	$\frac{4x_{11}+1}{3\left(6x_{11}^2-2x_{11}-5\right)}$	
w_4	0	0	0	1	$\frac{1-2x_{11}^2}{-6x_{11}^2+2x_{11}+5}$	$\frac{-2x_{11}^2+2x_{11}+2}{6x_{11}^2-2x_{11}-5}$	
z_5	0	0	0	0	$\frac{2(x_{11}+1)}{3\left(6x_{11}^2-2x_{11}-5\right)}$	$\frac{4x_{11}+1}{3\left(6x_{11}^2-2x_{11}-5\right)}$	
z_6	0	0	0	0	$\frac{4x_{11}+1}{3\left(6x_{11}^2-2x_{11}-5\right)}$	$\frac{x_{11}-8}{-18x_{11}^2+6x_{11}+15}$	

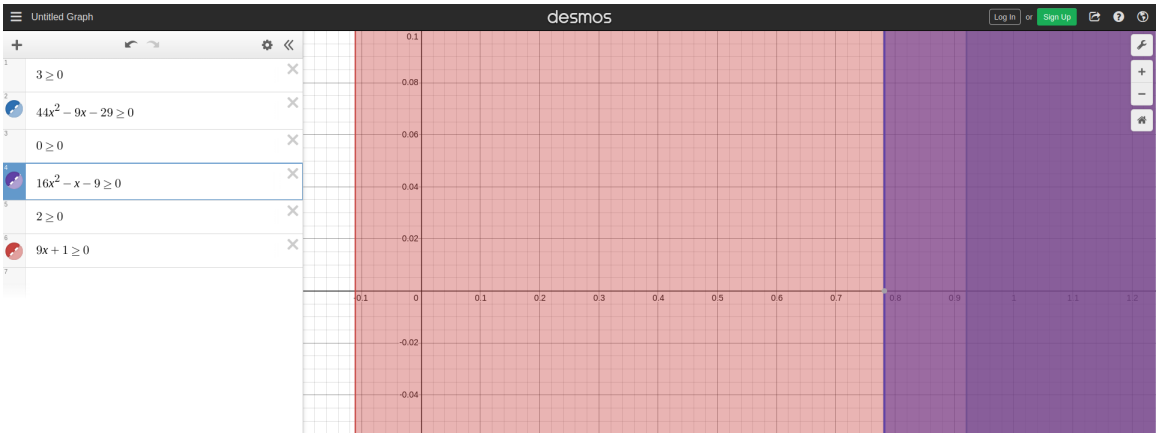
	z_1	z_2	z_3	z_4	z_5	z_6	
z_1	0	0	0	1	0	0	3
w_2	0	$\frac{2(x_{11}+1)}{3\left(6x_{11}^2-2x_{11}-5\right)}$	$\frac{2(x_{11}+1)}{3\left(-6x_{11}^2+2x_{11}+5\right)}$	$\frac{1-2x_{11}^2}{-6x_{11}^2+2x_{11}+5}$	0	0	$\frac{-44x_{11}^2+9x_{11}+29}{3\left(-6x_{11}^2+2x_{11}+5\right)}$
w_3	0	$\frac{2(x_{11}+1)}{3\left(-6x_{11}^2+2x_{11}+5\right)}$	$\frac{2(x_{11}+1)}{3\left(6x_{11}^2-2x_{11}-5\right)}$	$\frac{2x_{11}^2-1}{-6x_{11}^2+2x_{11}+5}$	0	0	$-\frac{-44x_{11}^2+9x_{11}+29}{-18x_{11}^2+6x_{11}+15}$
w_4	-1	$\frac{2x_{11}^2-1}{-6x_{11}^2+2x_{11}+5}$	$\frac{1-2x_{11}^2}{-6x_{11}^2+2x_{11}+5}$	$\frac{-6x_{11}^3+5x_{11}+1}{6x_{11}^2-2x_{11}-5}$	0	0	$\frac{4x_{11}^3-14x_{11}^2-x_{11}+8}{6x_{11}^2-2x_{11}-5}$
z_5	0	$\frac{2(x_{11}+1)}{3\left(-6x_{11}^2+2x_{11}+5\right)}$	$\frac{2(x_{11}+1)}{3\left(6x_{11}^2-2x_{11}-5\right)}$	$\frac{2x_{11}^2-1}{-6x_{11}^2+2x_{11}+5}$	1	0	$\frac{8x_{11}^2+3x_{11}+1}{3\left(-6x_{11}^2+2x_{11}+5\right)}$
z_6	0	$\frac{4x_{11}+1}{3\left(-6x_{11}^2+2x_{11}+5\right)}$	$\frac{4x_{11}+1}{3\left(6x_{11}^2-2x_{11}-5\right)}$	$\frac{2\left(x_{11}^2-x_{11}-1\right)}{6x_{11}^2-2x_{11}-5}$	0	1	$\frac{7x_{11}^2+15x_{11}-7}{-18x_{11}^2+6x_{11}+15}$



Boundaries associated with w_2 and w_3 overlap and create 0-dimensional invariancy region. Perform diagonal pivot for $w_2 \rightarrow z_2$.

Iteration 6

	w_1	w_2	w_3	w_4	w_5	w_6	z_1	z_2	z_3	z_4	z_5	z_6	
z_1	1	0	0	0	0	0	0	0	0	1	0	0	3
z_2	0	$\frac{3\left(6x_{11}^2-2x_{11}-5\right)}{2(x_{11}+1)}$	0	0	-1	$-\frac{4x_{11}+1}{2x_{11}+2}$	0	1	-1	$\frac{3\left(2x_{11}^2-1\right)}{2(x_{11}+1)}$	0	0	$\frac{44x_{11}^2-9x_{11}-29}{2(x_{11}+1)}$
w_3	0	1	1	0	0	0	0	0	0	0	0	0	0
w_4	0	$\frac{3\left(2x_{11}^2-1\right)}{2(x_{11}+1)}$	0	1	0	$-\frac{x_{11}+\frac{1}{2}}{x_{11}+1}$	-1	0	0	$-\frac{x_{11}+\frac{1}{2}}{x_{11}+1}$	0	0	$\frac{16x_{11}^2-x_{11}-9}{2(x_{11}+1)}$
z_5	0	1	0	0	0	0	0	0	0	0	1	0	2
z_6	0	$\frac{4x_{11}+1}{2(x_{11}+1)}$	0	0	0	$-\frac{1}{2x_{11}+2}$	0	0	0	$\frac{x_{11}+\frac{1}{2}}{x_{11}+1}$	0	1	$\frac{9x_{11}+1}{2(x_{11}+1)}$



So, by replacing x_{11} with λ in the RHS of the tableau above, we find the 5^{th} invariancy region that was not found using the mpLCP MATLAB implementation.

$x_{[1]}^2 + 1$