

• **Cycling Example (Bazaraa, Jarvis and Sherali, 1990)**

Minimize  $-\frac{3}{4}x_4 + 20x_5 - \frac{1}{2}x_6 + 6x_7$

Subject to  $x_1 + \frac{1}{4}x_4 - 8x_5 - x_6 + 9x_7 = 0$

$x_2 + \frac{1}{2}x_4 - 12x_5 - \frac{1}{2}x_6 + 3x_7 = 0$

$x_3 + x_6 = 1$

$x_1, x_2, x_3, x_4, x_5, x_6, x_7 \geq 0$

	z	$x_1$	$x_2$	$x_3$	$x_4$	$x_5$	$x_6$	$x_7$	RHS
z	1	0	0	0	$\frac{3}{4}$	-20	$\frac{1}{2}$	-6	0
$x_1$	0	1	0	0	$\frac{1}{4}$	-8	-1	9	0
$x_2$	0	0	1	0	$\frac{1}{2}$	-12	$-\frac{1}{2}$	3	0
$x_3$	0	0	0	1	0	0	1	0	1

	z	$x_1$	$x_2$	$x_3$	$x_4$	$x_5$	$x_6$	$x_7$	RHS
z	1	-3	0	0	0	4	$\frac{7}{2}$	-33	0
$x_4$	0	4	0	0	1	-32	-4	36	0
$x_2$	0	-2	1	0	0	④	$\frac{3}{2}$	-15	0
$x_3$	0	0	0	1	0	0	1	0	1

	z	$x_1$	$x_2$	$x_3$	$x_4$	$x_5$	$x_6$	$x_7$	RHS
z	1	-1	-1	0	0	0	2	-18	0
$x_4$	0	-12	8	0	1	0	⑧	-84	0
$x_5$	0	$-\frac{1}{2}$	$\frac{1}{4}$	0	0	1	$\frac{3}{8}$	$-\frac{15}{4}$	0
$x_3$	0	0	0	1	0	0	1	0	1

	z	$x_1$	$x_2$	$x_3$	$x_4$	$x_5$	$x_6$	$x_7$	RHS
z	1	2	-3	0	$-\frac{1}{4}$	0	0	3	0
$x_6$	0	$-\frac{3}{2}$	1	0	$\frac{1}{8}$	0	1	$-\frac{21}{2}$	0
$x_5$	0	$\frac{1}{16}$	$-\frac{1}{8}$	0	$-\frac{3}{64}$	1	0	③	0
$x_3$	0	$\frac{3}{2}$	-1	1	$-\frac{1}{8}$	0	0	$\frac{21}{2}$	1

	z	$x_1$	$x_2$	$x_3$	$x_4$	$x_5$	$x_6$	$x_7$	RHS
z	1	1	-1	0	$\frac{1}{2}$	-16	0	0	0
$x_6$	0	②	-6	0	$-\frac{5}{2}$	56	1	0	0
$x_7$	0	$\frac{1}{3}$	$-\frac{2}{3}$	0	$-\frac{1}{4}$	$\frac{16}{3}$	0	1	0
$x_3$	0	-2	6	1	$\frac{5}{2}$	-56	0	0	1

	z	$x_1$	$x_2$	$x_3$	$x_4$	$x_5$	$x_6$	$x_7$	RHS
z	1	0	2	0	$\frac{7}{4}$	-44	$-\frac{1}{2}$	0	0
$x_1$	0	1	-3	0	$-\frac{5}{4}$	28	$\frac{1}{2}$	0	0
$x_7$	0	0	①	0	$\frac{1}{6}$	-4	$-\frac{1}{6}$	1	0
$x_3$	0	0	0	1	0	0	1	0	1

	z	$x_1$	$x_2$	$x_3$	$x_4$	$x_5$	$x_6$	$x_7$	RHS
z	1	0	0	0	$\frac{3}{4}$	-20	$\frac{1}{2}$	-6	0
$x_1$	0	1	0	0	$\frac{1}{4}$	-8	-1	9	0
$x_2$	0	0	1	0	$\frac{1}{2}$	-12	$-\frac{1}{2}$	3	0
$x_3$	0	0	0	1	0	0	1	0	1