Summary

December 6, 2024

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0.1 Loaded Graphs

$0.1.1 g_{0}$

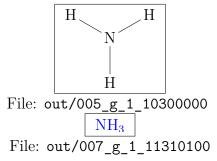
N C H

File: out/001_g_0_10300000

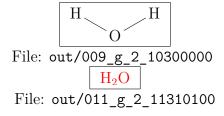
N CH

File: out/003_g_0_11310100

0.1.2 g_{1}

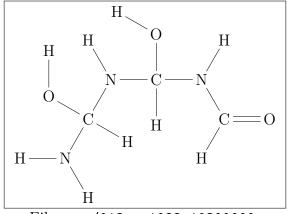


0.1.3 g_{2}

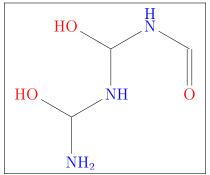


0.2 Product Graphs

0.2.1 p_{0,56}



File: out/013_g_1088_10300000



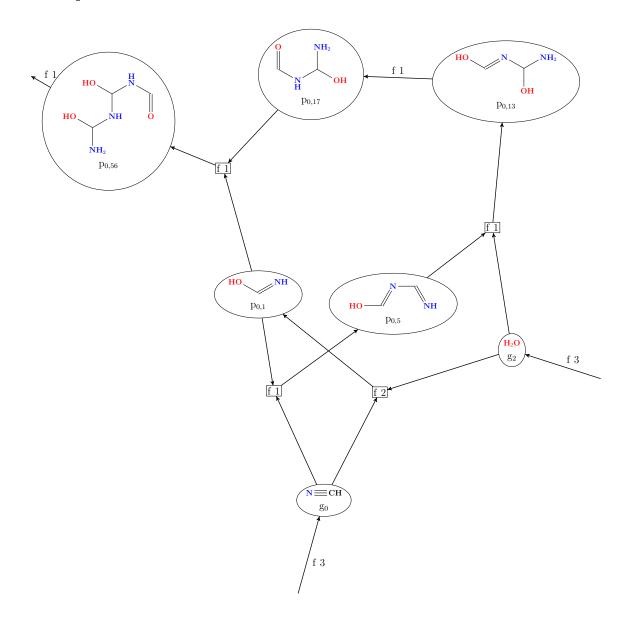
File: out/015_g_1088_11310100

0.3 Enumerated Flows

0.3.1 Solution 0

Overall Data

Objective val	lue	(non-integral): -0.0907411				
Vertex/Graph	In	Out	G	logK	t_order	
g_{0}	3	0	-5.507152	-6.000000	0	
g_{2}	3	0	-5.068043	-6.000000	0	
p_{0,13}	0	0	-21.240678	-9.000000	44	
p_{0,17}	0	0	-21.248887	-6.000000	45	
p_{0,1}	0	0	-10.610101	-6.000000	1	
p_{0,56}	0	1	-31.869324	-9.000000	67	
p_{0,5}	0	0	-16.158965	-6.000000	2	



 $File: \ \mathtt{out/029_dg_0_11100_f_0_0_filt}$

Vertex	InFlow	OutFlow	$x_v^{\Delta G^0}$	x_v^K	$x_v^{\Delta G}$	t_v
g_0	3	0	-14459.025578	-6.0	-14478.980288	0
g_2	3	0	-13306.144961	-6.0	-13326.099672	0
$p_{0,1}$	0	0	-27856.817054	-6.0	-27876.771765	1
$p_{0,5}$	0	0	-42425.357769	-6.0	-42445.31248	2
$p_{0,13}$	0	0	-55767.391129	-9.0	-55797.323194	44
$p_{0,17}$	0	0	-55788.944315	-6.0	-55808.899025	45
$p_{0,56}$	0	1	-83672.898792	-9.0	-83702.830857	67

Hyperedge	Source	Target	Flow	$x_e^{\Delta G}$	$\overline{x}_e^{\Delta G}$
6	$g_0, g_2,$	$p_{0,1}$,	2	-78.027426	-78.027426
14	$g_0, p_{0,1},$	$p_{0,5},$	1	-95.896048	-95.896048
123	$g_2, p_{0,5},$	$p_{0,13},$	1	-29.078853	-29.078853
196	$p_{0,1}, p_{0,17},$	$p_{0,56}$,	1	-20.327878	-20.327878
250	$p_{0,13}$,	$p_{0,17},$	1	-14.743641	-14.743641
Sum					-238.24061983109323

 $\Delta G = -31.610126140061343$

 $\Delta E = -0.09074105981529618$

|E| = 6

 $|\mathbf{U}| = 5$

0.3.2 Solution 1

Overall Data

Objective value (non-integral): -0.0907411 Vertex/Graph In Out G logK t order g_{0} 3 0 -5.507152 -6.000000 0 g_{2} 3 0 -5.068043 -6.000000 0 p_{0,13} -21.240635 -6.000000 3 0 $p_{0,15}$ -10.625174 -7.068707 2 0 0 $p_{0,1}$ 0 0 -10.610080 -6.000000 1 $p_{0,56}$ 0 1 -31.869324 -9.000000 67 p_{0,5} 0 0 -16.158998 -9.000000 2



 $File: \ \mathtt{out/040_dg_0_11100_f_0_1_filt}$

Vertex	InFlow	OutFlow	$x_v^{\Delta G^0}$	x_v^K	$x_v^{\Delta G}$	t_v
g_0	3	0	-14459.025578	-6.0	-14478.980288	0
g_2	3	0	-13306.144961	-6.0	-13326.099672	0
$p_{0,1}$	0	0	-27856.761341	-6.0	-27876.716051	1
$p_{0,5}$	0	0	-42425.44262	-9.0	-42455.374686	2
$p_{0,13}$	0	0	-55767.279594	-6.0	-55787.234305	3
$p_{0,15}$	0	0	-27896.389963	-7.068707	-27919.898963	2
$p_{0,56}$	0	1	-83672.898792	-9.0	-83702.830857	67

Hyperedge	Source	Target	Flow	$x_e^{\Delta G}$	$\overline{x}_e^{\Delta G}$
6	$g_0, g_2,$	$p_{0,1},$	2	-77.971712	-77.971712
14	$g_0, p_{0,1},$	$p_{0,5},$	1	-102.846157	-102.846157
36	$p_{0,1},$	$p_{0,15},$	1	-42.054425	-42.054425
123	$g_2, p_{0,5},$	$p_{0,13},$	1	-15.263378	-15.263378
169	$p_{0,13}, p_{0,15},$	$p_{0,56},$	1	0.006113	0.006113
Sum					-238.24061983109323

 $\Delta G = \text{-}31.61012640261131$

 $\Delta E = -0.09074105981529618$

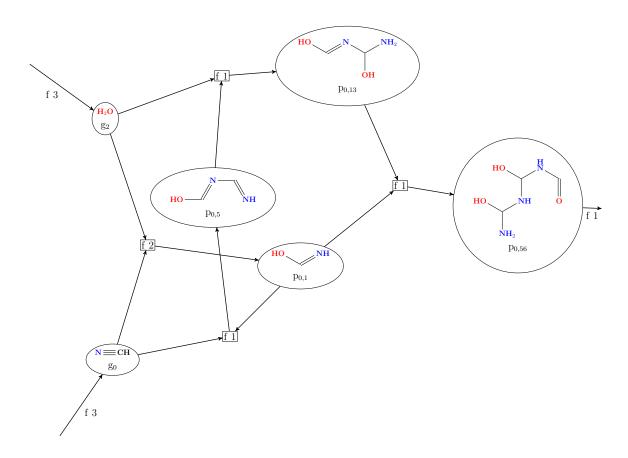
|E| = 6

|U| = 5

0.3.3 Solution 2

Overall Data

Objective value (non-integral): -0.0907411 Vertex/Graph In Out G logK t_order 3 g_{0} 0 -5.507152 -9.000000 0 g_{2} 3 0 -5.068043 -9.000000 0 p_{0,13} 0 0 -21.240635 -6.000000 65 p_{0,1} 0 0 -10.610101 -6.000000 1 p_{0,56} -31.869324 -9.000000 67 0 1 p_{0,5} 0 0 -16.158998 -9.000000 64



 $File: \verb"out/049_dg_0_11100_f_0_2_filt"$

Vertex	InFlow	OutFlow	$x_v^{\Delta G^0}$	x_v^K	$x_v^{\Delta G}$	t_v
g_0	3	0	-14459.025578	-9.0	-14488.957643	0
g_2	3	0	-13306.144961	-9.0	-13336.077027	0
$p_{0,1}$	0	0	-27856.817054	-6.0	-27876.771765	1
$p_{0,5}$	0	0	-42425.44262	-9.0	-42455.374686	64
$p_{0,13}$	0	0	-55767.279594	-6.0	-55787.234305	65
$p_{0.56}$	0	1	-83672.898792	-9.0	-83702.830857	67

Hyperedge	Source	Target	Flow	$x_e^{\Delta G}$	$\overline{x}_e^{\Delta G}$
6	$g_0, g_2,$	$p_{0,1}$,	2	-64.408336	-64.408336
14	$g_0, p_{0,1},$	$p_{0,5},$	1	-95.980898	-95.980898
123	$g_2, p_{0,5},$	$p_{0,13},$	1	-8.453833	-8.453833
263	$p_{0,1}, p_{0,13},$	$p_{0,56},$	1	-41.992598	-41.992598
Sum					-238.2406198310954

 $\Delta G = \text{-}27.524399740592116$

 $\Delta E = \text{-}0.090741059815297$

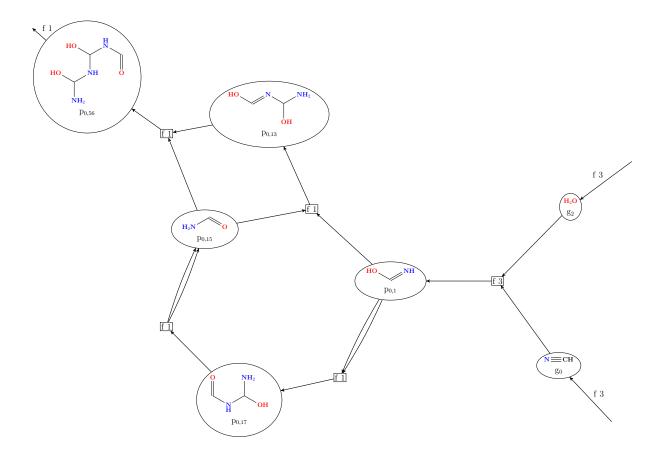
|E| = 5

|U| = 4

0.3.4 Solution 3

Overall Data

Objective val	Lue	(non-integral): -0.0610221			
Vertex/Graph	In	Out	G	logK	t_order
g_{0}	3	0	-5.507152	-6.000000	0
g_{2}	3	0	-5.068033	-6.000000	0
p_{0,13}	0	0	-21.240678	-6.383976	34
p_{0,15}	0	0	-10.625195	-6.611014	32
p_{0,17}	0	0	-21.248887	-9.000000	31
p_{0,1}	0	0	-10.610101	-6.000000	1
p_{0,56}	0	1	-31.869324	-9.000000	67



 $File: \ \mathtt{out/058_dg_0_11100_f_0_3_filt}$

Vertex	InFlow	OutFlow	$x_v^{\Delta G^0}$	x_v^K	$x_v^{\Delta G}$	t_v
g_0	3	0	-14459.025578	-6.0	-14478.980288	0
g_2	3	0	-13306.118349	-6.0	-13326.073059	0
$p_{0,1}$	0	0	-27856.817054	-6.0	-27876.771765	1
$p_{0,13}$	0	0	-55767.391129	-6.383976	-55788.62286	34
$p_{0,15}$	0	0	-27896.445756	-6.611014	-27918.432567	32
$p_{0,17}$	0	0	-55788.944315	-9.0	-55818.87638	31
$p_{0,56}$	0	1	-83672.898792	-9.0	-83702.830857	67

Hyperedge	Source	Target	Flow	$x_e^{\Delta G}$	$\overline{x}_e^{\Delta G}$
6	$g_0, g_2,$	$p_{0,1},$	3	-78.054038	-78.054038
40	$p_{0,1}, p_{0,1},$	$p_{0,17}$,	1	-68.500661	-68.500661
169	$p_{0,13}, p_{0,15},$	$p_{0,56}$,	1	0.006113	0.006113
192	$p_{0,1}, p_{0,15},$	$p_{0,13}$,	1	0.006113	0.006113
237	$p_{0,17},$	$p_{0,15}, p_{0,15},$	1	-13.530559	-13.530559
Sum					-160.2133773524056

 $\Delta G = -31.618110547014965$

 $\Delta E = -0.06102205269551553$

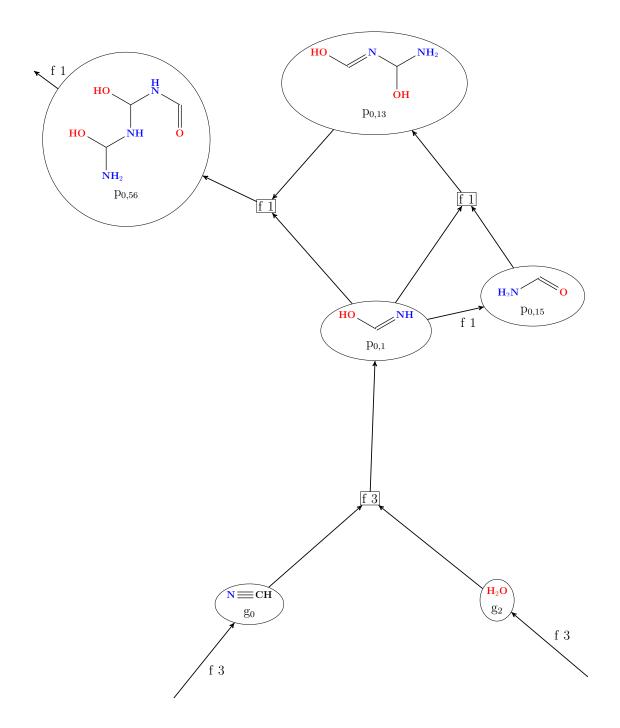
|E| = 7

 $|\mathbf{U}| = 5$

0.3.5 Solution 4

Overall Data

Objective value (non-integral): -0.0610221 Vertex/Graph In Out G logK t order 3 0 g_{0} -5.507152 -6.000000 0 g_{2} 3 0 -5.068033 -9.000000 0 p_{0,13} 0 0 -21.240678 -9.000000 65 p_{0,15} 0 0 -10.625174 -9.000000 63 -10.610101 -6.251618 1 $p_{0,1}$ 0 0 $p_{0,56}$ 0 1 -31.869260 -6.000000 67



 $File: \verb"out/067_dg_0_11100_f_0_4_filt"$

Vertex	InFlow	OutFlow	$x_v^{\Delta G^0}$	x_v^K	$x_v^{\Delta G}$	t_v
g_0	3	0	-14459.025578	-6.0	-14478.980288	0
g_2	3	0	-13306.118349	-9.0	-13336.050414	0
$p_{0,1}$	0	0	-27856.817054	-6.251618	-27877.608592	1
$p_{0,13}$	0	0	-55767.391129	-9.0	-55797.323194	65
$p_{0,15}$	0	0	-27896.389963	-9.0	-27926.322028	63
$p_{0,56}$	0	1	-83672.731446	-6.0	-83692.686157	67

Hyperedge	Source	Target	Flow	$x_e^{\Delta G}$	$\overline{x}_e^{\Delta G}$
6	$g_0, g_2,$	$p_{0,1},$	3	-71.815628	-71.815628
36	$p_{0,1},$	$p_{0,15},$	1	-45.811319	-45.811319
192	$p_{0,1}, p_{0,15},$	$p_{0,13},$	1	0.006113	0.006113
263	$p_{0,1}, p_{0,13},$	$p_{0,56}$,	1	-27.523494	-27.523494
Sum					-160.21337735240343

 $\Delta G = -28.877558100183425$

 $\Delta E = -0.06102205269551471$

|E| = 6

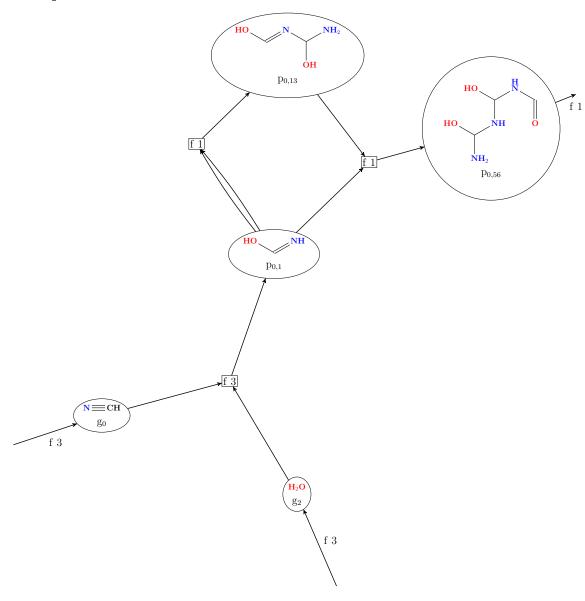
|U| = 4

0.3.6 Solution 5

Overall Data

Objective value (non-integral): -0.0610221 Vertex/Graph In Out G logK t ord

t order g_{0} 3 0 -5.507152 -9.000000 0 g_{2} 3 0 -5.068033 -9.000000 20 $p_{0,13}$ 0 0 -21.240635 -6.000000 45 0 0 -10.610080 -6.000000 21 $p_{0,1}$ $p_{0,56}$ 0 1 -31.869324 -9.000000 67



 $File: \verb"out/076_dg_0_11100_f_0_5_filt"$

Vertex	InFlow	OutFlow	$x_v^{\Delta G^0}$	x_v^K	$x_v^{\Delta G}$	t_v
$\overline{g_0}$	3	0	-14459.025578	-9.0	-14488.957643	0
g_2	3	0	-13306.118349	-9.0	-13336.050414	20
$p_{0,1}$	0	0	-27856.761341	-6.0	-27876.716051	21
$p_{0,13}$	0	0	-55767.279594	-6.0	-55787.234305	45
$p_{0,56}$	0	1	-83672.898792	-9.0	-83702.830857	67

Hyperedge	Source	Target	Flow	$x_e^{\Delta G}$	$\overline{x}_e^{\Delta G}$
6	$g_0, g_2,$	$p_{0,1},$	3	-64.379235	-64.379235
30	$p_{0,1}, p_{0,1},$	$p_{0,13},$	1	-40.137823	-40.137823
263	$p_{0,1}, p_{0,13},$	$p_{0,56},$	1	-42.048312	-42.048312
Sum					-160.2133773524013

 $\Delta G = -27.532383359895846$

 $\Delta E = \text{-}0.0610220526955139$

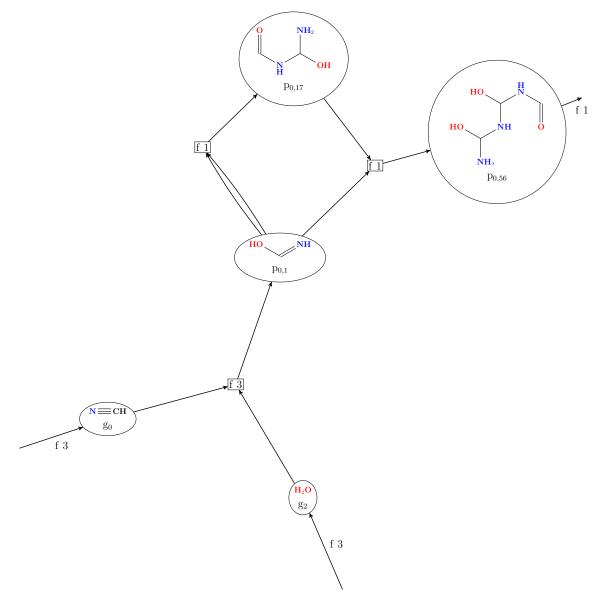
```
\begin{aligned} |E| &= 5\\ |U| &= 3 \end{aligned}
```

0.3.7 Solution 6

Overall Data

Objective value (non-integral): -0.0610221 Vertex/Graph In Out G logK t_order g_{0} 3 0 -5.507152 -6.000000 0 g_{2} 3 0 -5.068043 -9.000000 0 $p_{0,17}$ -21.248844 -6.000000 45 0 0 p_{0,1} 0 0 -10.610080 -6.000000 21 -31.869324 -9.000000 67 $p_{0,56}$ 0 1

Filtered Graph



File: out/085_dg_0_11100_f_0_6_filt

Vertex	InFlow	OutFlow	$x_v^{\Delta G^0}$	x_v^K	$x_v^{\Delta G}$	t_v
g_0	3	0	-14459.025578	-6.0	-14478.980288	0
g_2	3	0	-13306.144961	-9.0	-13336.077027	0
$p_{0,1}$	0	0	-27856.761341	-6.0	-27876.716051	21
$p_{0,17}$	0	0	-55788.832737	-6.0	-55808.787447	45
$p_{0.56}$	0	1	-83672.898792	-9.0	-83702.830857	67

Hyperedge	Source	Target	Flow	$x_e^{\Delta G}$	$\overline{x}_e^{\Delta G}$
6	$g_0, g_2,$	$p_{0,1},$	3	-71.162167	-71.162167
40	$p_{0,1}, p_{0,1},$	$p_{0,17},$	1	-61.690966	-61.690966
196	$p_{0,1}, p_{0,17},$	$p_{0,56},$	1	-20.495169	-20.495169
Sum					-160.2133773524013

 $\Delta G = -29.567263202876692$

 $\Delta E = \text{-}0.0610220526955139$

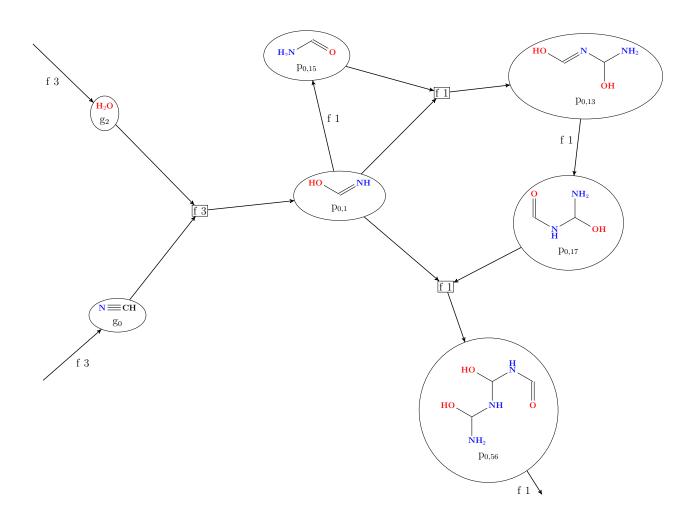
|E| = 5

|U| = 3

0.3.8 Solution 7

Overall Data

Objective value (non-integral): -0.0610221 Vertex/Graph In Out G t_{order} logK 3 0 -5.507152 -6.000000 0 g_{0} g_{2} 3 0 -5.068043 -6.000000 20 $p_{0,13}$ -21.240635 -6.000000 44 -10.625195 -6.202446 22 $p_{0,15}$ 0 0 p_{0,17} 0 0 -21.248844 -9.000000 45 $p_{0,1}$ 0 0 -10.610080 -6.000000 21 -31.869324 -9.000000 67 $p_{0,56}$ 0 1



 $File: \verb"out/094_dg_0_11100_f_0_7_filt"$

Vertex	InFlow	OutFlow	$x_v^{\Delta G^0}$	x_v^K	$x_v^{\Delta G}$	t_v
g_0	3	0	-14459.025578	-6.0	-14478.980288	0
g_2	3	0	-13306.144961	-6.0	-13326.099672	20
$p_{0,1}$	0	0	-27856.761341	-6.0	-27876.716051	21
$p_{0,13}$	0	0	-55767.279594	-6.0	-55787.234305	44
$p_{0,15}$	0	0	-27896.445756	-6.202446	-27917.073757	22
$p_{0,17}$	0	0	-55788.832737	-9.0	-55818.764803	45
$p_{0,56}$	0	1	-83672.898792	-9.0	-83702.830857	67

Hyperedge	Source	Target	Flow	$x_e^{\Delta G}$	$\overline{x}_e^{\Delta G}$
6	$g_0, g_2,$	$p_{0,1}$,	3	-77.971712	-77.971712
36	$p_{0,1},$	$p_{0,15},$	1	-40.143936	-40.143936
192	$p_{0,1}, p_{0,15},$	$p_{0,13},$	1	0.006113	0.006113
196	$p_{0,1}, p_{0,17},$	$p_{0,56},$	1	-13.685624	-13.685624
250	$p_{0,13}$,	$p_{0,17},$	1	-28.362688	-28.362688
Sum					-160.2133773524013

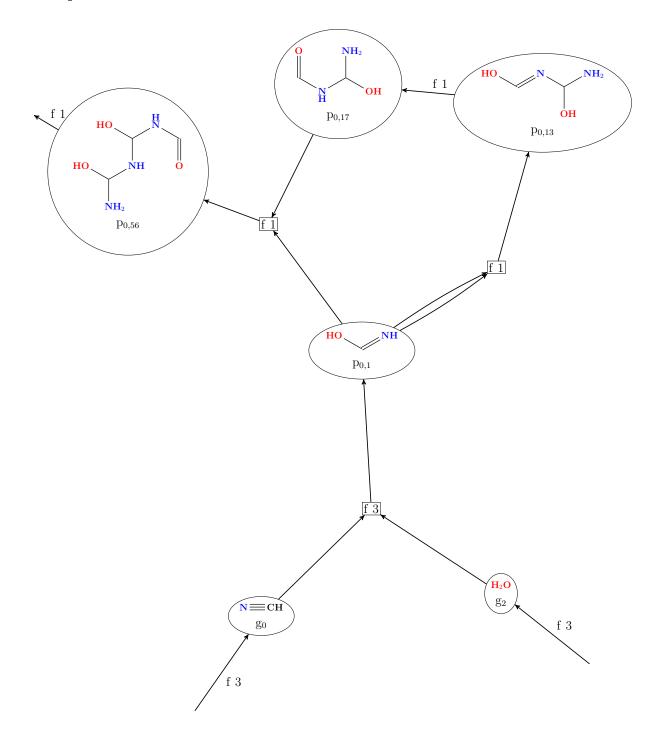
$$\begin{split} \Delta G &= \text{-}31.61012640261131 \\ \Delta E &= \text{-}0.06102205269551389 \end{split}$$

 $\begin{aligned} |E| &= 7 \\ |U| &= 5 \end{aligned}$

0.3.9 Solution 8

Overall Data

Objective value (non-integral): -0.0610221 Vertex/Graph In Out G logK t_{order} g_{0} 3 0 -5.507152 -9.000000 0 g_{2} 3 0 -5.068043 -9.000000 0 $p_{0,13}$ 0 0 -21.240635 -6.000000 3 0 0 -21.248844 -6.000000 65 p_{0,17} p_{0,1} 0 0 -10.610080 -6.000000 1 $p_{0,56}$ 0 1 -31.869324 -9.000000 67



 $File: \verb"out/103_dg_0_11100_f_0_8_filt"$

Vertex	InFlow	OutFlow	$x_v^{\Delta G^0}$	x_v^K	$x_v^{\Delta G}$	t_v
g_0	3	0	-14459.025578	-9.0	-14488.957643	0
g_2	3	0	-13306.144961	-9.0	-13336.077027	0
$p_{0,1}$	0	0	-27856.761341	-6.0	-27876.716051	1
$p_{0,13}$	0	0	-55767.279594	-6.0	-55787.234305	3
$p_{0,17}$	0	0	-55788.832737	-6.0	-55808.787447	65
$p_{0,56}$	0	1	-83672.898792	-9.0	-83702.830857	67

Hyperedge	Source	Target	Flow	$x_e^{\Delta G}$	$\overline{x}_e^{\Delta G}$
6	$g_0, g_2,$	$p_{0,1},$	3	-64.352622	-64.352622
30	$p_{0,1}, p_{0,1},$	$p_{0,13},$	1	-40.137823	-40.137823
196	$p_{0,1}, p_{0,17},$	$p_{0,56}$,	1	-20.495169	-20.495169
250	$p_{0,13},$	$p_{0,17},$	1	-21.553143	-21.553143
Sum					-160.21337735239916

 $\Delta G = -27.52439947804215$

 $\Delta E = \text{-}0.061022052695513085$

|E| = 6

|U| = 4

0.3.10 Solution 9

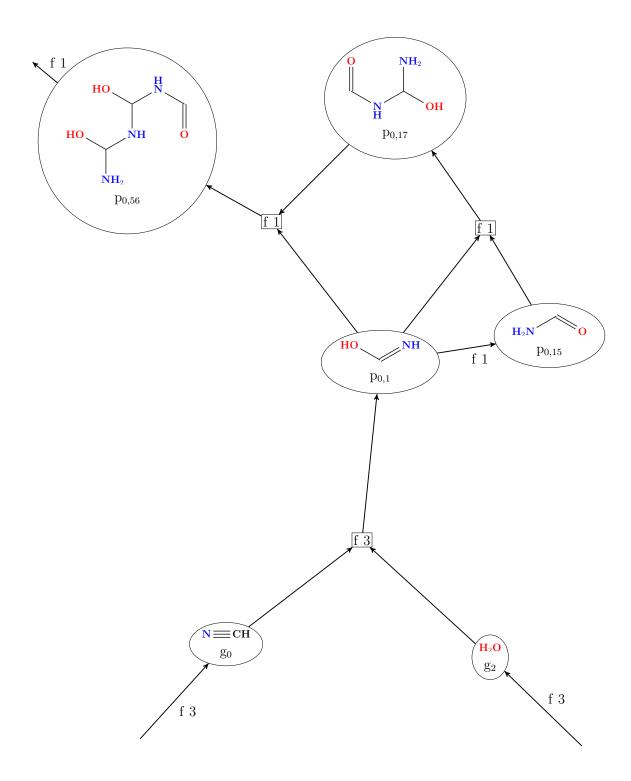
Overall Data

Objective value (non-integral): -0.0610221

Vertex/Graph In Out G logK t_order

g {0} 3 0 -5.507152 -6.000000 0

g_{0} 3 0 -5.507152 -6.000000 0 3 0 -5.068043 -9.000000 0 g_{2} $p_{0,15}$ 0 0 -10.625195 -9.000000 2 -21.248844 -6.000000 4 $p_{0,17}$ 0 0 $p_{0,1}$ 0 0 -10.610080 -6.000000 1 -31.869324 -9.000000 67 $p_{0,56}$ 0 1



 $File: \ \mathtt{out/112_dg_0_11100_f_0_9_filt}$

Vertex	InFlow	OutFlow	$x_v^{\Delta G^0}$	x_v^K	$x_v^{\Delta G}$	t_v
g_0	3	0	-14459.025578	-6.0	-14478.980288	0
g_2	3	0	-13306.144961	-9.0	-13336.077027	0
$p_{0,1}$	0	0	-27856.761341	-6.0	-27876.716051	1
$p_{0,15}$	0	0	-27896.445756	-9.0	-27926.377821	2
$p_{0,17}$	0	0	-55788.832737	-6.0	-55808.787447	4
$p_{0,56}$	0	1	-83672.898792	-9.0	-83702.830857	67

Hyperedge	Source	Target	Flow	$x_e^{\Delta G}$	$\overline{x}_e^{\Delta G}$
6	$g_0, g_2,$	$p_{0,1}$,	3	-71.162167	-71.162167
36	$p_{0,1},$	$p_{0,15},$	1	-46.49396	-46.49396
183	$p_{0,1}, p_{0,15},$	$p_{0,17},$	1	-15.197006	-15.197006
196	$p_{0,1}, p_{0,17},$	$p_{0,56},$	1	-20.495169	-20.495169
Sum					-160.21337735239916

 $\Delta G = \text{-}29.567263202876692$

 $\Delta E = \text{-}0.061022052695513085$

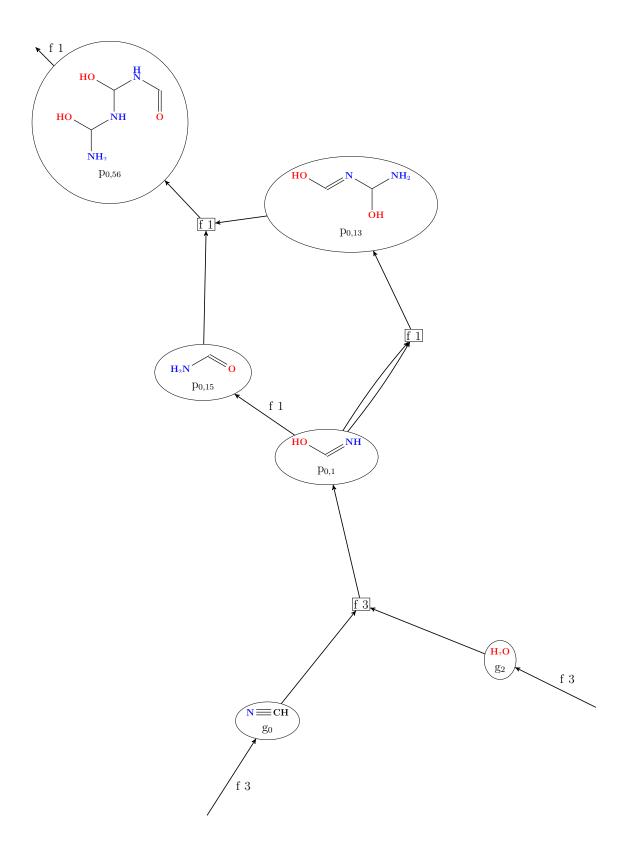
|E| = 6

|U| = 4

0.3.11 Solution 10

Overall Data

Objective value (non-integral): -0.0610221 Vertex/Graph In Out G logK t_order g_{0} 3 0 -5.507152 -9.000000 0 3 g_{2} 0 -5.068043 -9.000000 0 p_{0,13} 0 0 -21.240678 -6.994990 3 $p_{0,15}$ 0 0 -10.625195 -6.000000 2 p_{0,1} -10.610101 -6.000000 1 0 0 p_{0,56} 0 1 -31.869324 -9.000000 67



 $File: \ {\tt out/121_dg_0_11100_f_0_10_filt}$

Vertex	InFlow	OutFlow	$x_v^{\Delta G^0}$	x_v^K	$x_v^{\Delta G}$	t_v
g_0	3	0	-14459.025578	-9.0	-14488.957643	0
g_2	3	0	-13306.144961	-9.0	-13336.077027	0
$p_{0,1}$	0	0	-27856.817054	-6.0	-27876.771765	1
$p_{0,13}$	0	0	-55767.391129	-6.99499	-55790.654961	3
$p_{0,15}$	0	0	-27896.445756	-6.0	-27916.400466	2
$p_{0,56}$	0	1	-83672.898792	-9.0	-83702.830857	67

Hyperedge	Source	Target	Flow	$x_e^{\Delta G}$	$\overline{x}_e^{\Delta G}$
6	$g_0, g_2,$	$p_{0,1},$	3	-64.408336	-64.408336
30	$p_{0,1}, p_{0,1},$	$p_{0,13},$	1	-42.396406	-42.396406
36	$p_{0,1},$	$p_{0,15},$	1	-39.628701	-39.628701
169	$p_{0,13}, p_{0,15},$	$p_{0,56},$	1	0.006113	0.006113
Sum					-160.21337735239916

 $\Delta G = -27.524399740592116$

 $\Delta E = \text{-}0.061022052695513085$

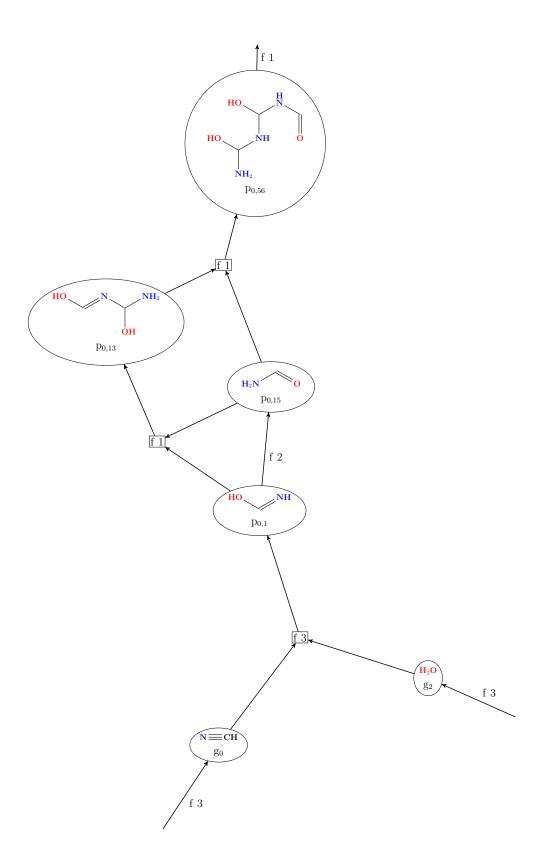
|E| = 6

|U| = 4

0.3.12 Solution 11

Overall Data

Objective val	(non-integral): -0.0459283					
Vertex/Graph In		Out	G	logK	t_order	
g_{0}	3	0	-5.507152	-6.000000	0	
g_{2}	3	0	-5.068043	-6.000000	0	
p_{0,13}	0	0	-21.240678	-7.016876	44	
p_{0,15}	0	0	-10.625174	-6.000000	22	
p_{0,1}	0	0	-10.610080	-6.000000	21	
p_{0,56}	0	1	-31.869324	-9.00000	67	



 $File: \ \mathtt{out/130_dg_0_11100_f_0_11_filt}$

Vertex	InFlow	OutFlow	$x_v^{\Delta G^0}$	x_v^K	$x_v^{\Delta G}$	t_v
g_0	3	0	-14459.025578	-6.0	-14478.980288	0
g_2	3	0	-13306.144961	-6.0	-13326.099672	0
$p_{0,1}$	0	0	-27856.761341	-6.0	-27876.716051	21
$p_{0,13}$	0	0	-55767.391129	-7.016876	-55790.727752	44
$p_{0,15}$	0	0	-27896.389963	-6.0	-27916.344673	22
$p_{0,56}$	0	1	-83672.898792	-9.0	-83702.830857	67

Hyperedge	Source	Target	Flow	$x_e^{\Delta G}$	$\overline{x}_e^{\Delta G}$
6	$g_0, g_2,$	$p_{0,1}$,	3	-77.971712	-77.971712
36	$p_{0,1},$	$p_{0,15},$	2	-39.628622	-39.628622
169	$p_{0,13}, p_{0,15},$	$p_{0,56},$	1	0.0	0.0
192	$p_{0,1}, p_{0,15},$	$p_{0,13},$	1	-2.928891	-2.928891
Sum					-120.58475524860832

 $\Delta G = \text{-}31.61012640261131$

 $\Delta E = \text{-}0.045928307677273586$

 $\begin{aligned} |E| &= 7 \\ |U| &= 4 \end{aligned}$