

# Summary

October 14, 2024

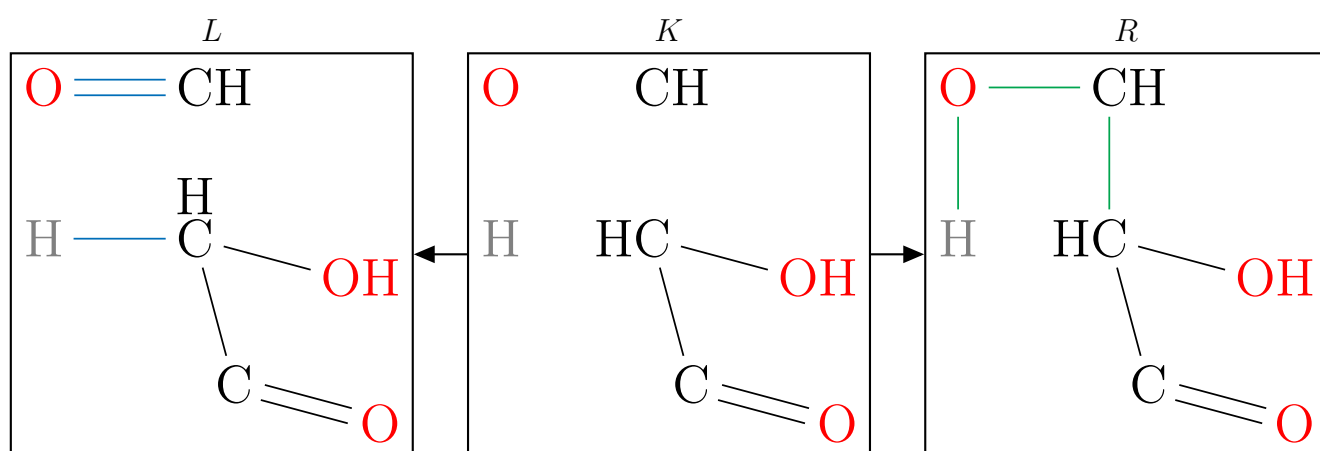
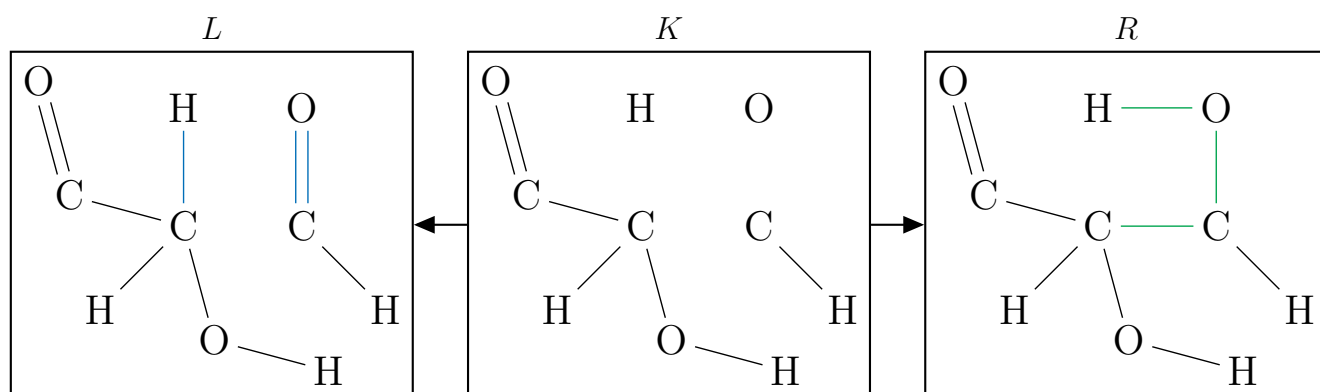
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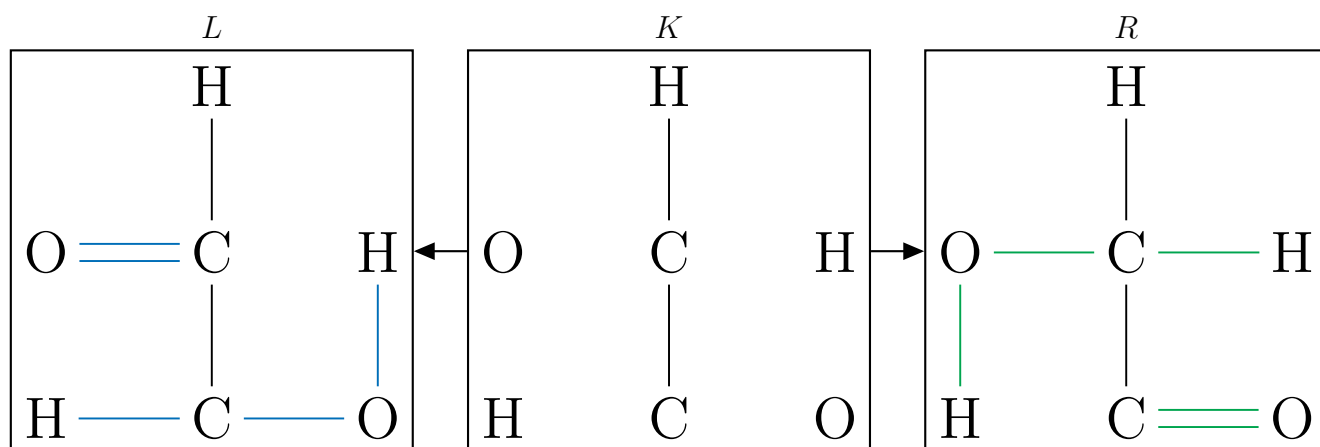
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0.7.37	Solution 45	58
0.7.38	Solution 46	60
0.7.39	Solution 47	61
0.7.40	Solution 48	63
0.7.41	Solution 49	64
0.7.42	Solution 50	64
0.7.43	Solution 51	66
0.7.44	Solution 52	68
0.7.45	Solution 53	70
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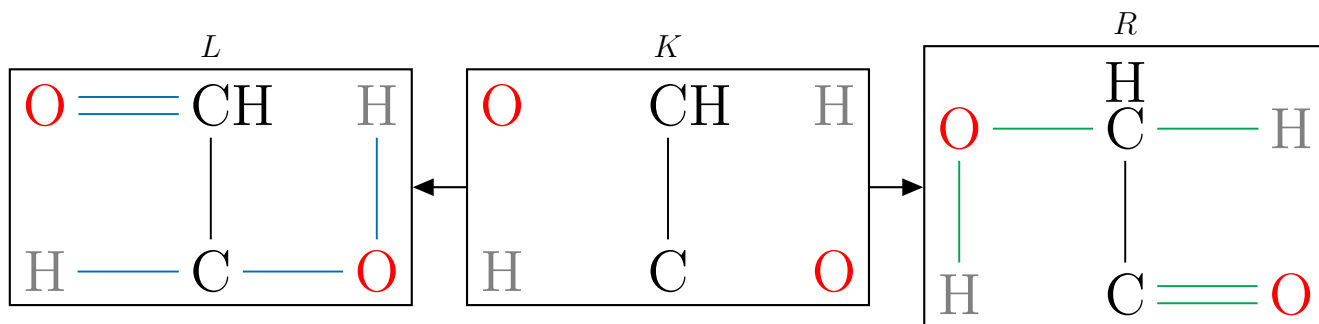
## 0.1 Loaded Rules

### 0.1.1 AL



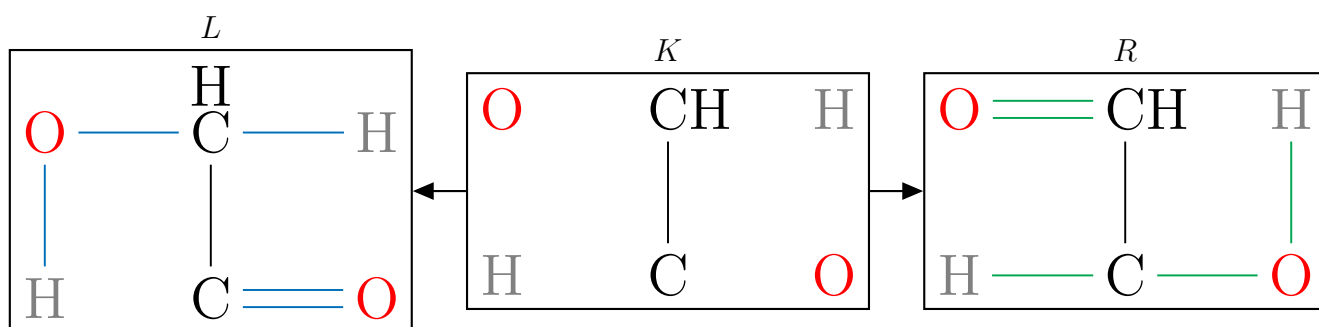
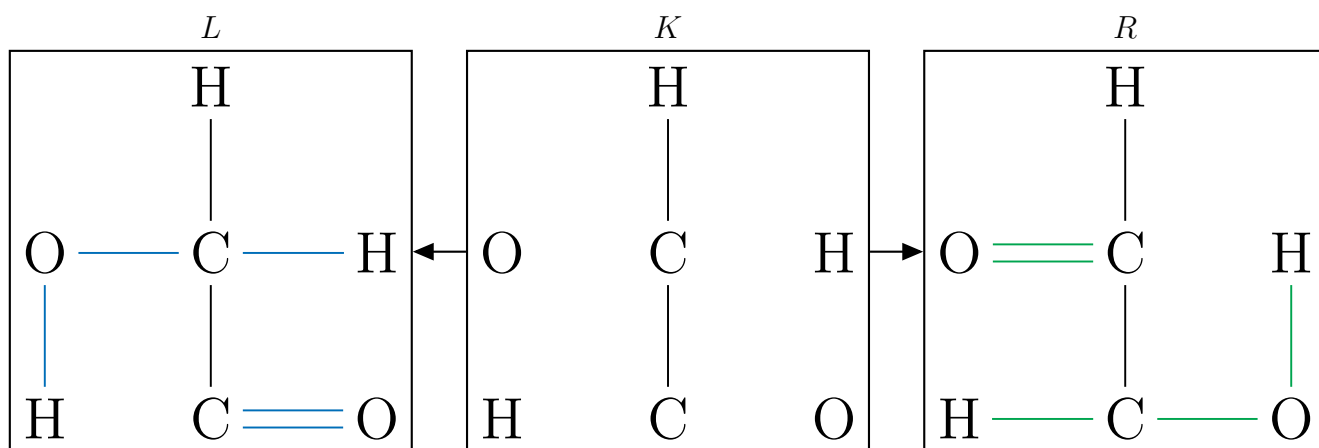
### 0.1.2 AlKe





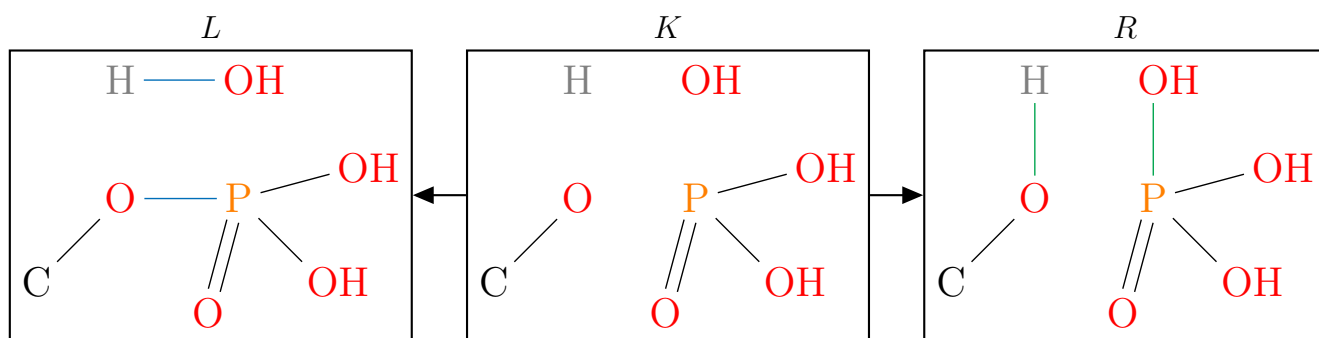
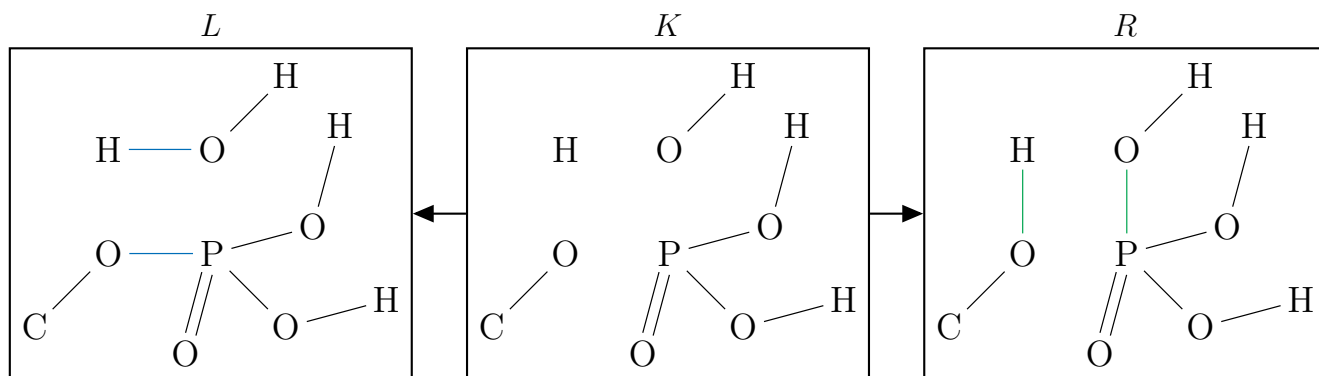
$$|\{e \in \text{outEdges}(1) \mid \text{label}(\text{target}(e)) \in \{\text{'0'}\}\}| = 1$$

### 0.1.3 KeAl

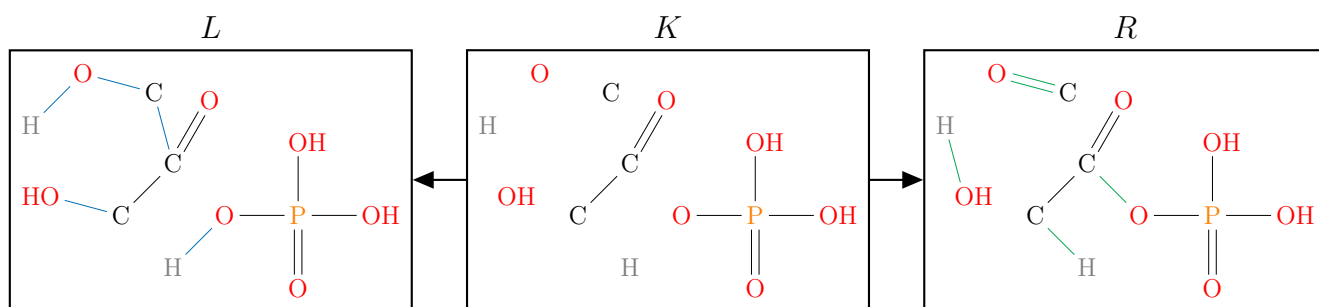
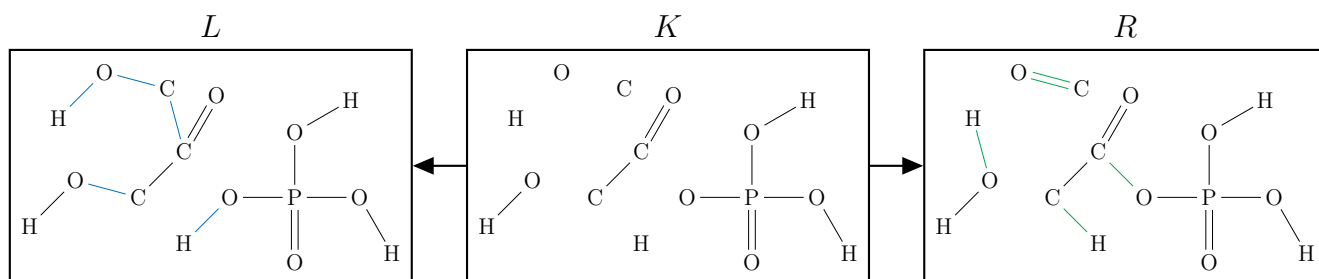


$$|\{e \in \text{outEdges}(1) \mid \text{label}(\text{target}(e)) \in \{\text{'0'}\}\}| = 1$$

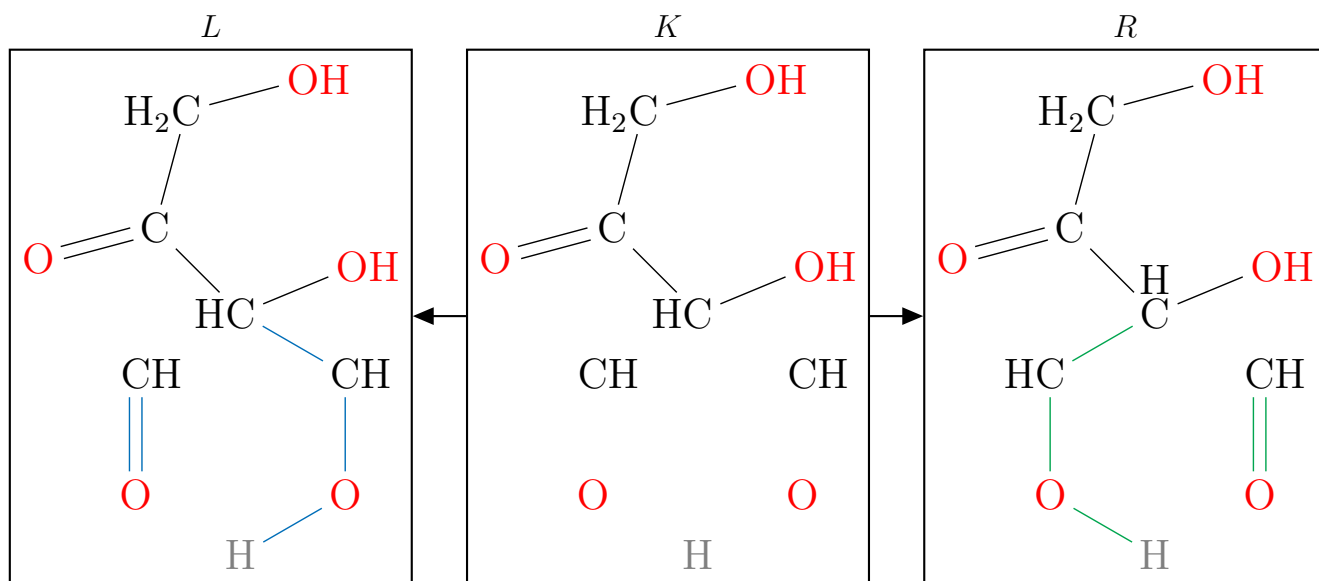
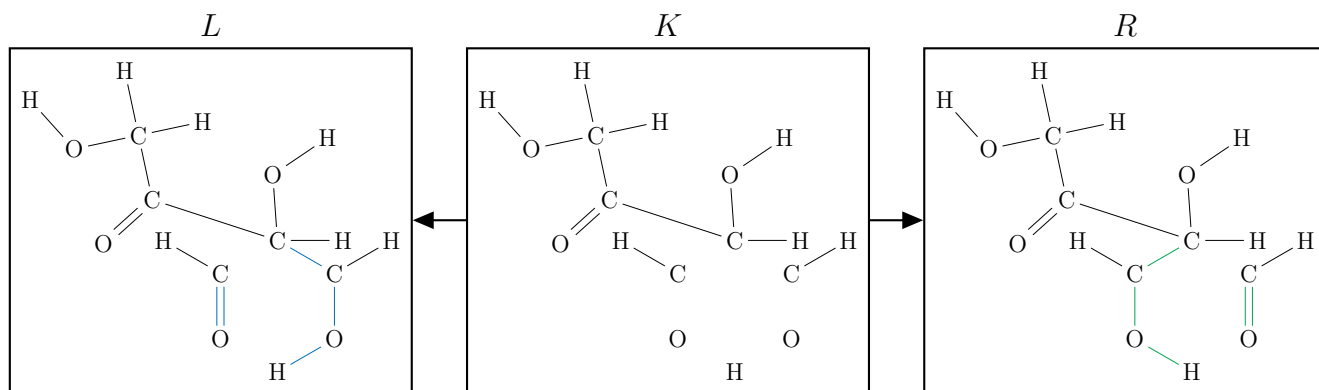
### 0.1.4 PHL



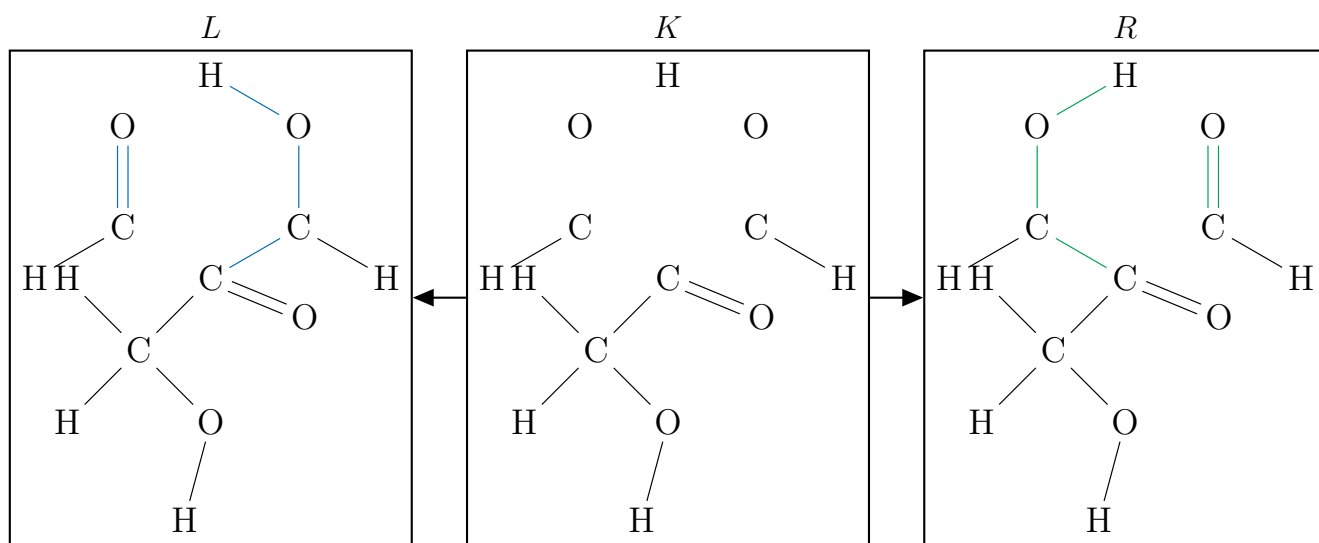
### 0.1.5 PKL

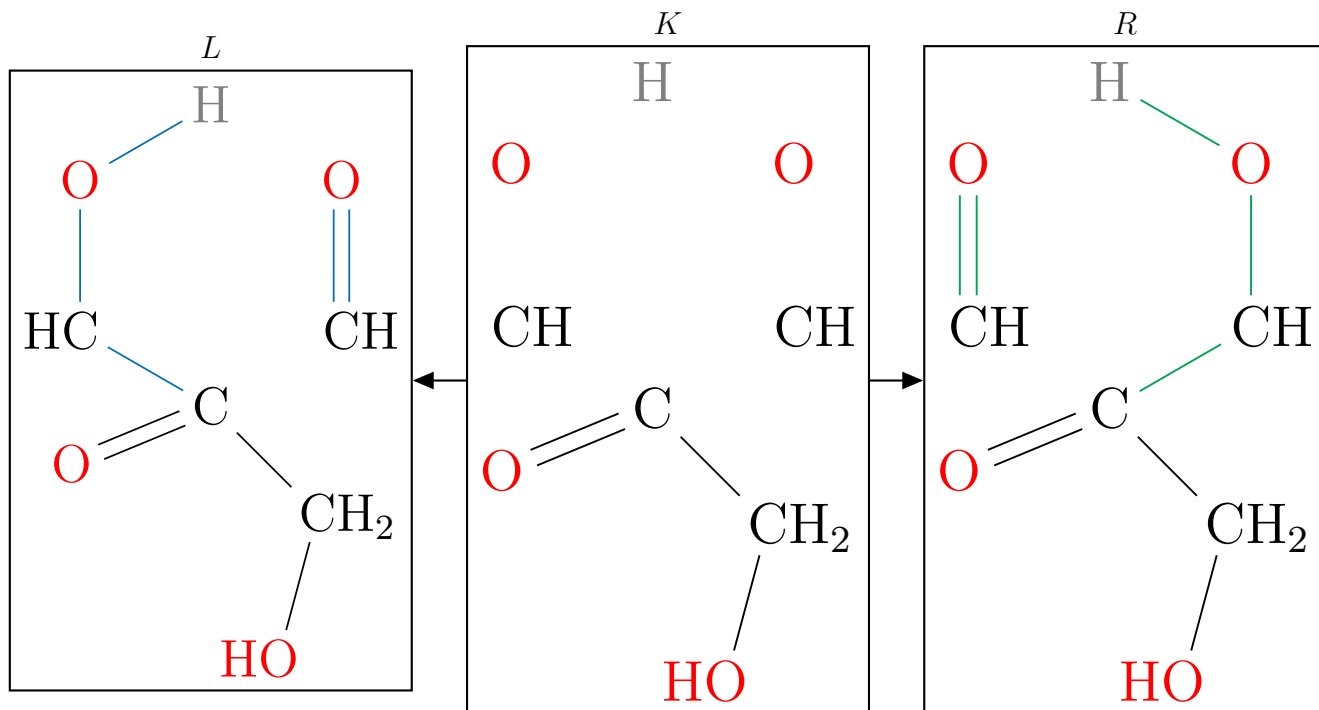


## 0.1.6 TAL



## 0.1.7 TKL





## 0.2 Derivation Graph

### 0.2.1 DG Hyper, dg\_0

Figure too large, see out/035\_dg\_0\_11100\_coord.pdf

File: out/198\_dg\_0\_11100

$|V| = 81$   
 $|E| = 414$



### 0.3 Enumerated Flows with 10 reactions

### 0.4 Enumerated Flows with 5 unique reactions

### 0.5 Enumerated Flows with 6 unique reactions

#### 0.5.1 Solution 7

##### Overall Data

Objective value (integral): 10

Vertex/Graph	In	Out
--------------	----	-----

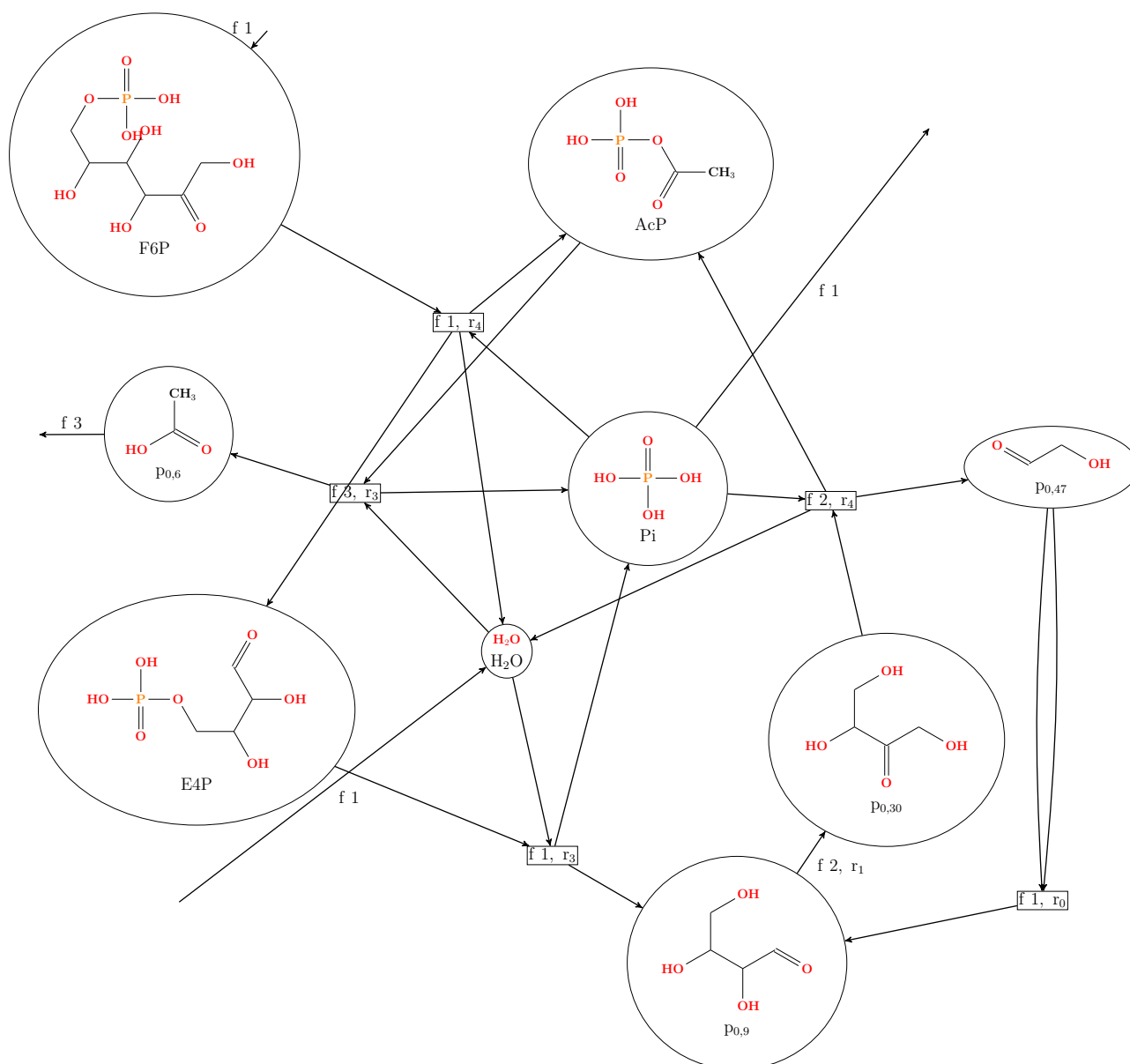
F6P	1	0
-----	---	---

H <sub>20</sub>	1	0
-----------------	---	---

Pi	0	1
----	---	---

p <sub>{0,6}</sub>	0	3
--------------------	---	---

## Filtered Graph



File: out/203\_dg\_0\_11100\_f\_0\_7\_filt

$$|\mathbf{E}| = 6 \quad |\mathbf{P}| = 10$$

### 0.5.2 Solution 8

## Overall Data

Objective value (integral): 10

Vertex/Graph	In	Out
1	0	0
2	0	0
3	0	0
4	0	0
5	0	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0
17	0	0
18	0	0
19	0	0
20	0	0
21	0	0
22	0	0
23	0	0
24	0	0
25	0	0
26	0	0
27	0	0
28	0	0
29	0	0
30	0	0
31	0	0
32	0	0
33	0	0
34	0	0
35	0	0
36	0	0
37	0	0
38	0	0
39	0	0
40	0	0
41	0	0
42	0	0
43	0	0
44	0	0
45	0	0
46	0	0
47	0	0
48	0	0
49	0	0
50	0	0
51	0	0
52	0	0
53	0	0
54	0	0
55	0	0
56	0	0
57	0	0
58	0	0
59	0	0
60	0	0
61	0	0
62	0	0
63	0	0
64	0	0
65	0	0
66	0	0
67	0	0
68	0	0
69	0	0
70	0	0
71	0	0
72	0	0
73	0	0
74	0	0
75	0	0
76	0	0
77	0	0
78	0	0
79	0	0
80	0	0
81	0	0
82	0	0
83	0	0
84	0	0
85	0	0
86	0	0
87	0	0
88	0	0
89	0	0
90	0	0
91	0	0
92	0	0
93	0	0
94	0	0
95	0	0
96	0	0
97	0	0
98	0	0
99	0	0
100	0	0
101	0	0
102	0	0
103	0	0
104	0	0
105	0	0
106	0	0
107	0	0
108	0	0
109	0	0
110	0	0
111	0	0
112	0	0
113	0	0
114	0	0
115	0	0
116	0	0
117	0	0
118	0	0
119	0	0
120	0	0
121	0	0
122	0	0
123	0	0
124	0	0
125	0	0
126	0	0
127	0	0
128	0	0
129	0	0
130	0	0
131	0	0
132	0	0
133	0	0
134	0	0
135	0	0
136	0	0
137	0	0
138	0	0
139	0	

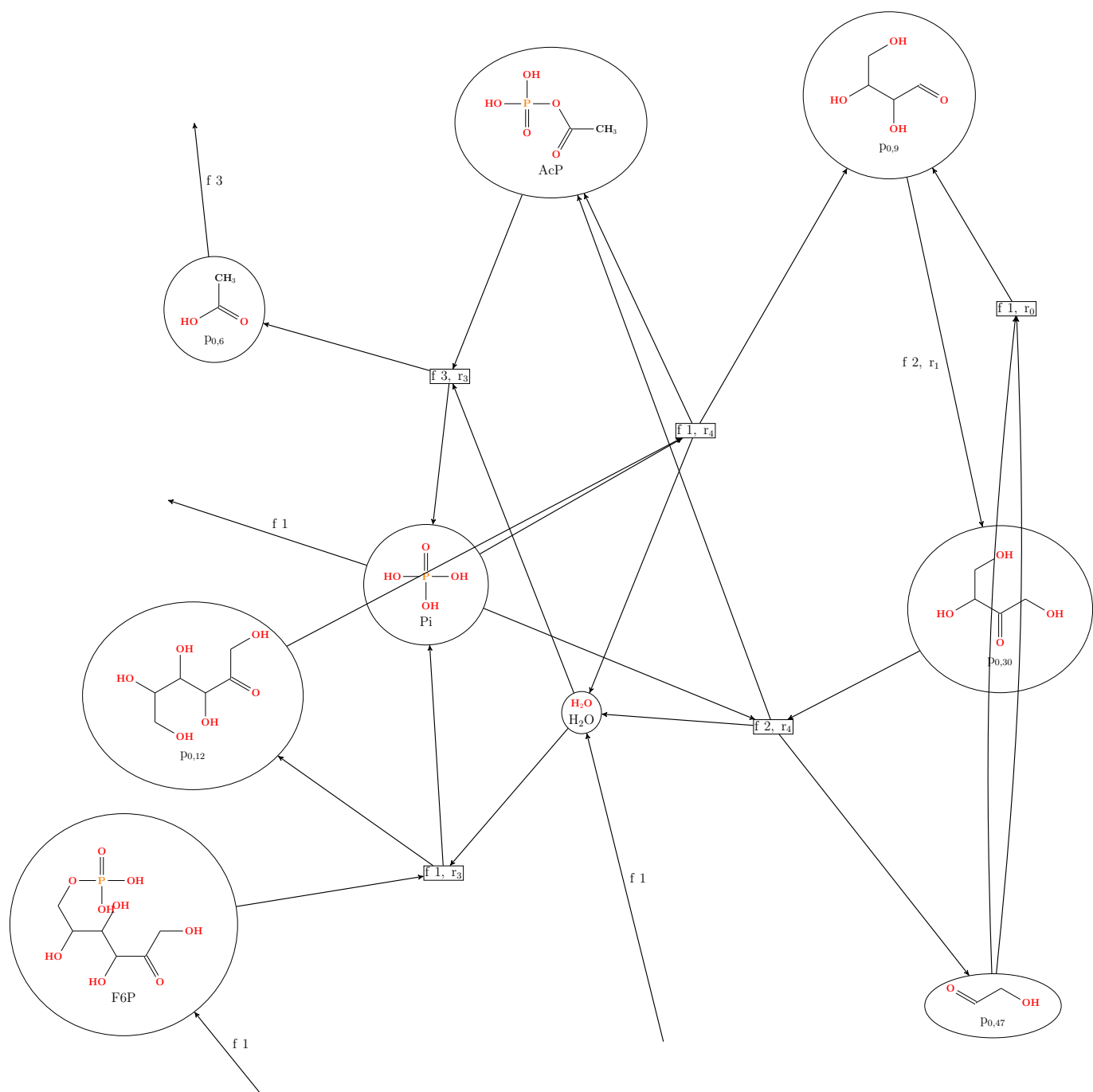
F6P	1	0
-----	---	---

H\_20                    1   0

Pi	0	1
----	---	---

$$p_{\{0,6\}} \quad 0 \quad 3$$

Filtered Graph



File: out/208\_dg\_0\_11100\_f\_0\_8\_filt

$|E| = 6 \quad |P| = 10$

0.5.3 Solution 14

Overall Data

Objective value (integral): 10

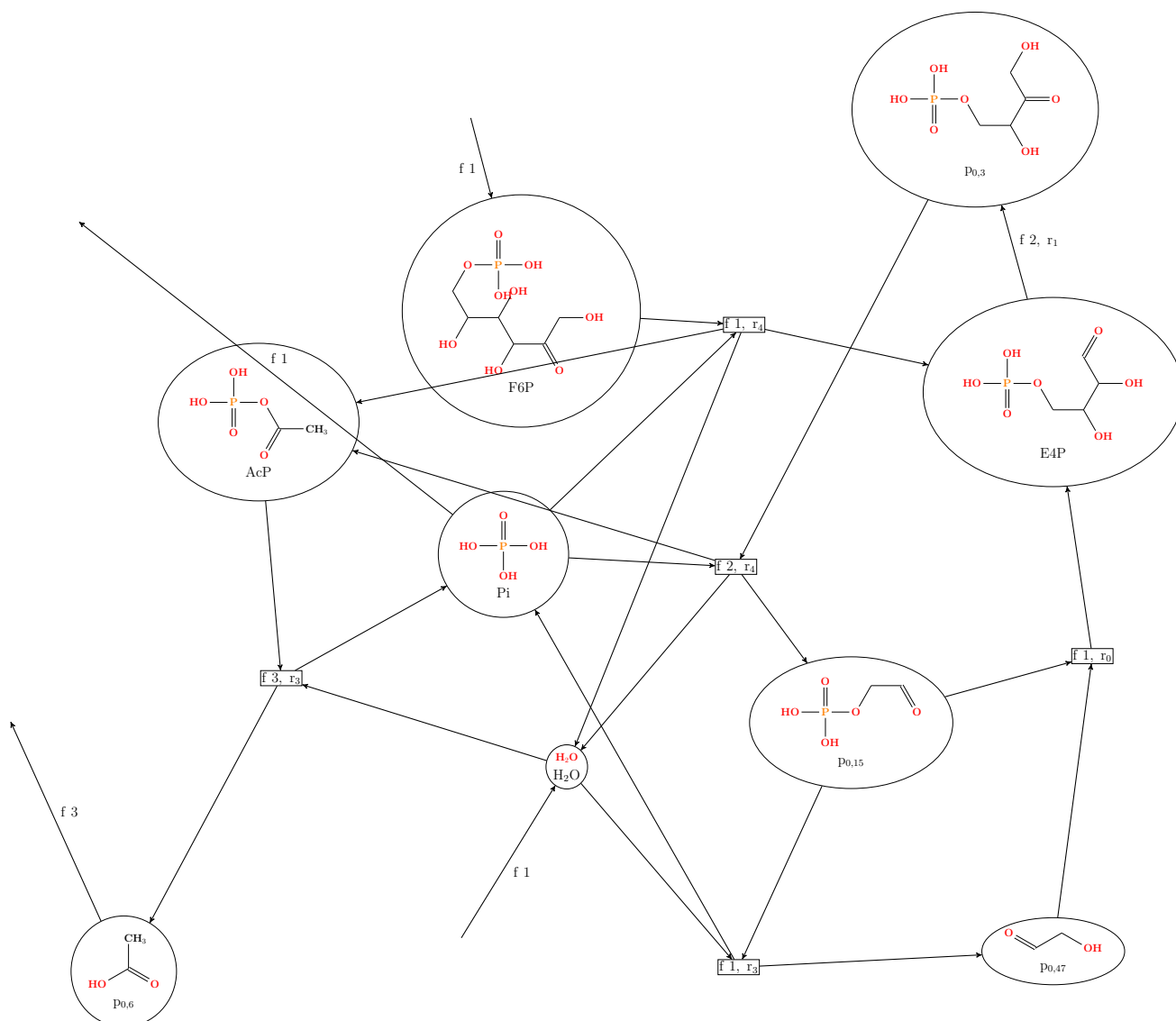
Vertex/Graph In Out

F6P 1 0

H\_20 1 0

Pi            0   1  
p\_{0,6}        0   3

## Filtered Graph



File: out/213\_dg\_0\_11100\_f\_0\_14\_filt

$|E| = 6$   $|P| = 10$

## 0.6 Enumerated Flows with 7 unique reactions

### 0.6.1 Solution 1

#### Overall Data

Objective value (integral): 10

Vertex/Graph In Out

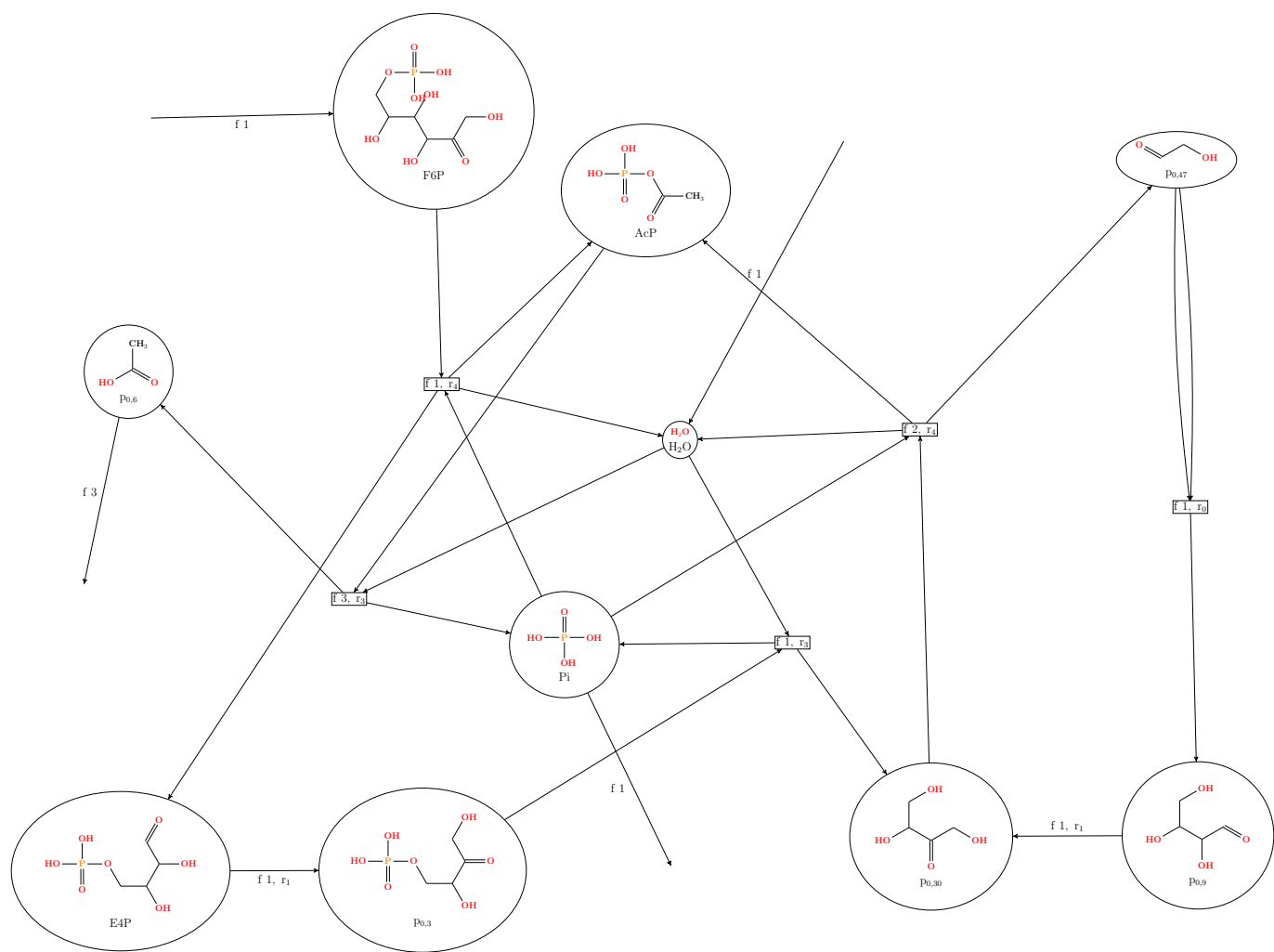
F6P            1   0

H<sub>2</sub>O          1   0

Pi             0   1

p\_{0,6}        0   3

Filtered Graph



File: out/218\_dg\_0\_11100\_f\_0\_1\_filt

$|E| = 7 \quad |P| = 10$

0.6.2 Solution 10

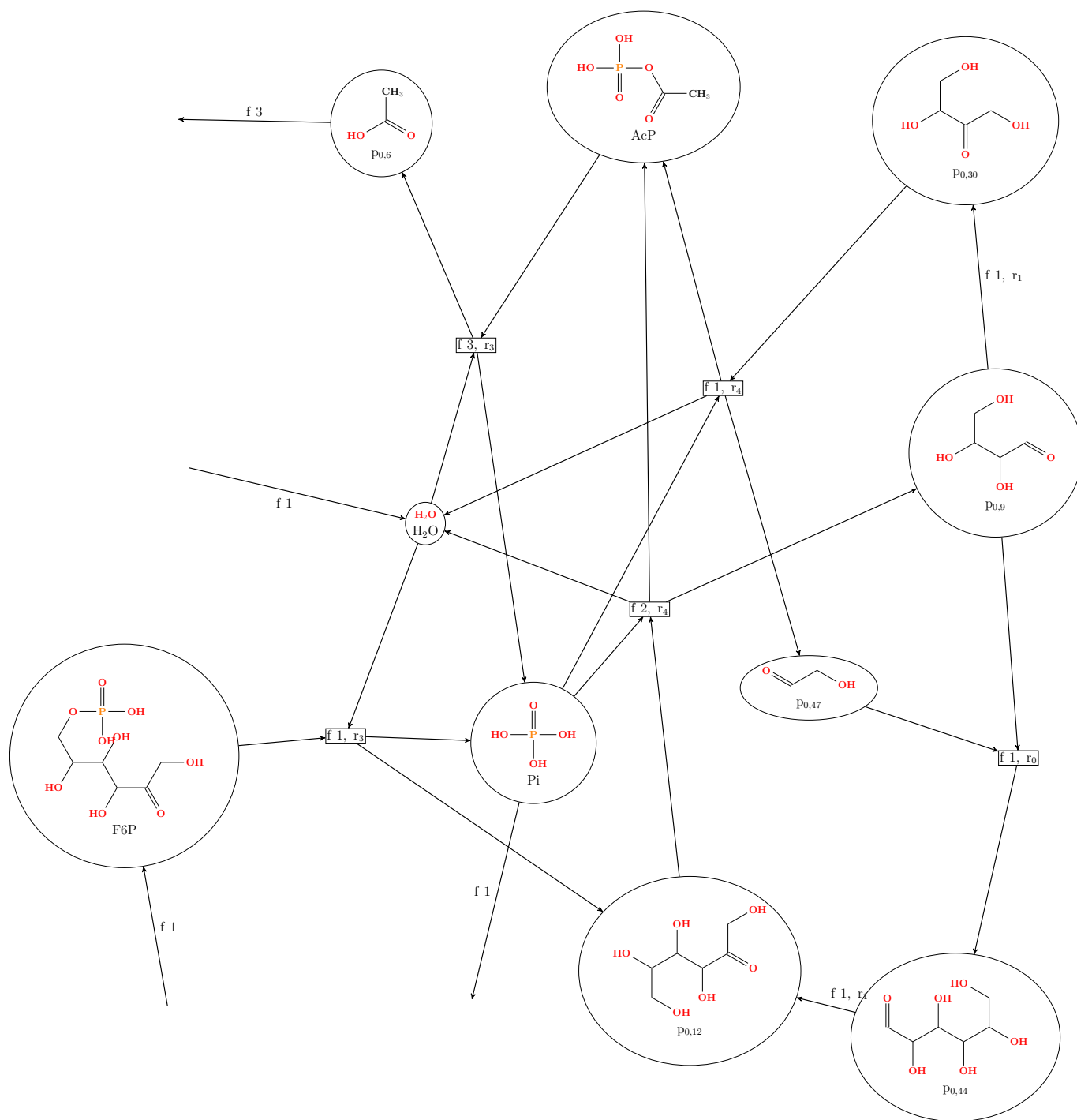
Overall Data

Objective value (integral): 10

Vertex/Graph In Out

F6P	1	0
H_20	1	0
Pi	0	1
p_{0,6}	0	3

## Filtered Graph



File: out/223\_dg\_0\_11100\_f\_0\_10\_filt

$$|\mathbf{E}| = 7 \quad |\mathbf{P}| = 10$$

### 0.6.3 Solution 20

## Overall Data

Objective value (integral): 10

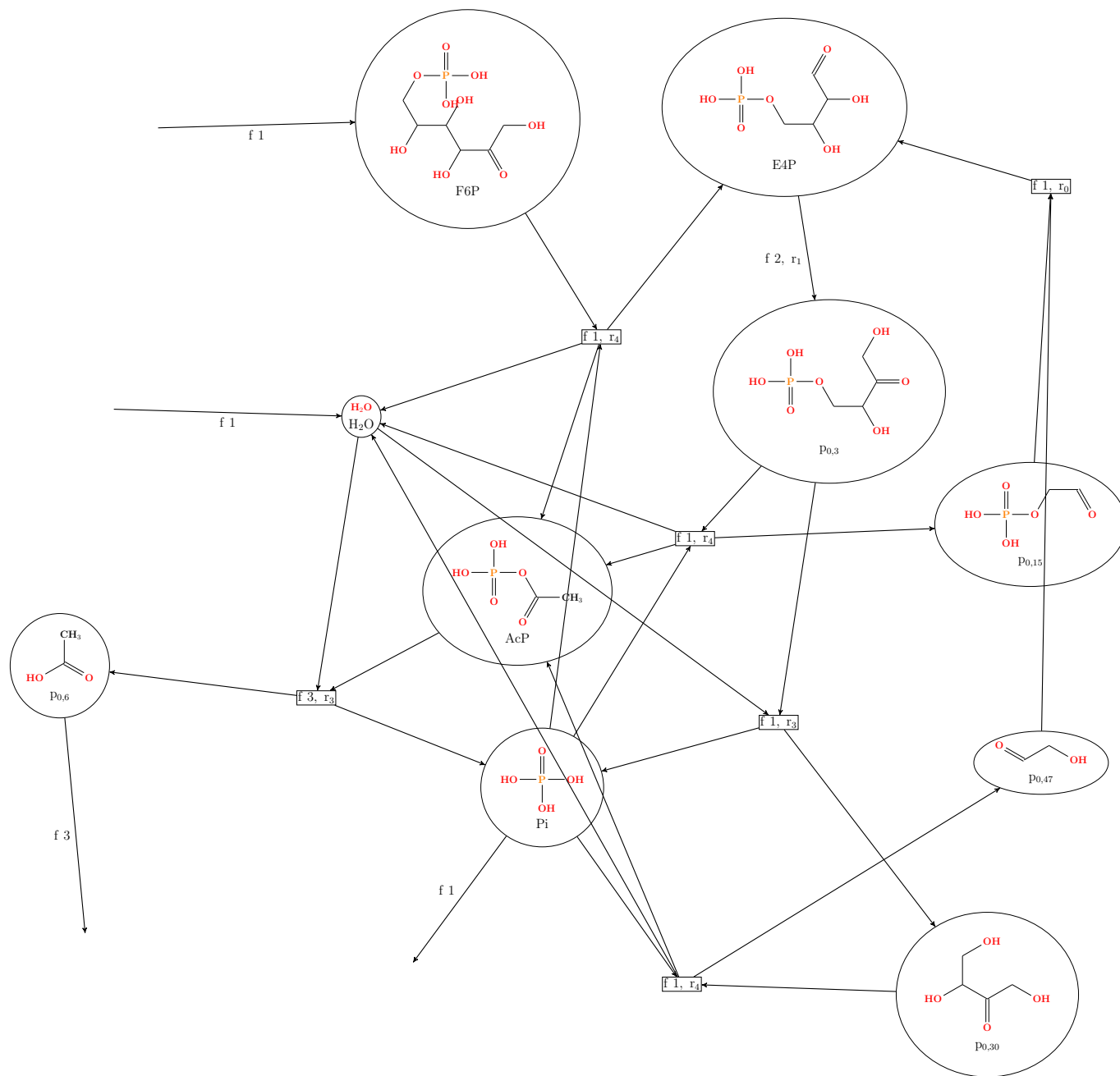
Vertex/Graph	In	Out
1	0	0
2	0	0
3	0	0
4	0	0
5	0	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0
17	0	0
18	0	0
19	0	0
20	0	0
21	0	0
22	0	0
23	0	0
24	0	0
25	0	0
26	0	0
27	0	0
28	0	0
29	0	0
30	0	0
31	0	0
32	0	0
33	0	0
34	0	0
35	0	0
36	0	0
37	0	0
38	0	0
39	0	0
40	0	0
41	0	0
42	0	0
43	0	0
44	0	0
45	0	0
46	0	0
47	0	0
48	0	0
49	0	0
50	0	0
51	0	0
52	0	0
53	0	0
54	0	0
55	0	0
56	0	0
57	0	0
58	0	0
59	0	0
60	0	0
61	0	0
62	0	0
63	0	0
64	0	0
65	0	0
66	0	0
67	0	0
68	0	0
69	0	0
70	0	0
71	0	0
72	0	0
73	0	0
74	0	0
75	0	0
76	0	0
77	0	0
78	0	0
79	0	0
80	0	0
81	0	0
82	0	0
83	0	0
84	0	0
85	0	0
86	0	0
87	0	0
88	0	0
89	0	0
90	0	0
91	0	0
92	0	0
93	0	0
94	0	0
95	0	0
96	0	0
97	0	0
98	0	0
99	0	0
100	0	0
101	0	0
102	0	0
103	0	0
104	0	0
105	0	0
106	0	0
107	0	0
108	0	0
109	0	0
110	0	0
111	0	0
112	0	0
113	0	0
114	0	0
115	0	0
116	0	0
117	0	0
118	0	0
119	0	0
120	0	0
121	0	0
122	0	0
123	0	0
124	0	0
125	0	0
126	0	0
127	0	0
128	0	0
129	0	0
130	0	0
131	0	0
132	0	0
133	0	0
134	0	0
135	0	0
136	0	0
137	0	0
138	0	0
139	0	

F6P	1	0
-----	---	---

H_20	1	0
------	---	---

Pi	0	1
p_{0,6}	0	3

## Filtered Graph



File: out/228\_dg\_0\_11100\_f\_0\_20\_filt

$|E| = 7$   $|P| = 10$

## 0.6.4 Solution 26

### Overall Data

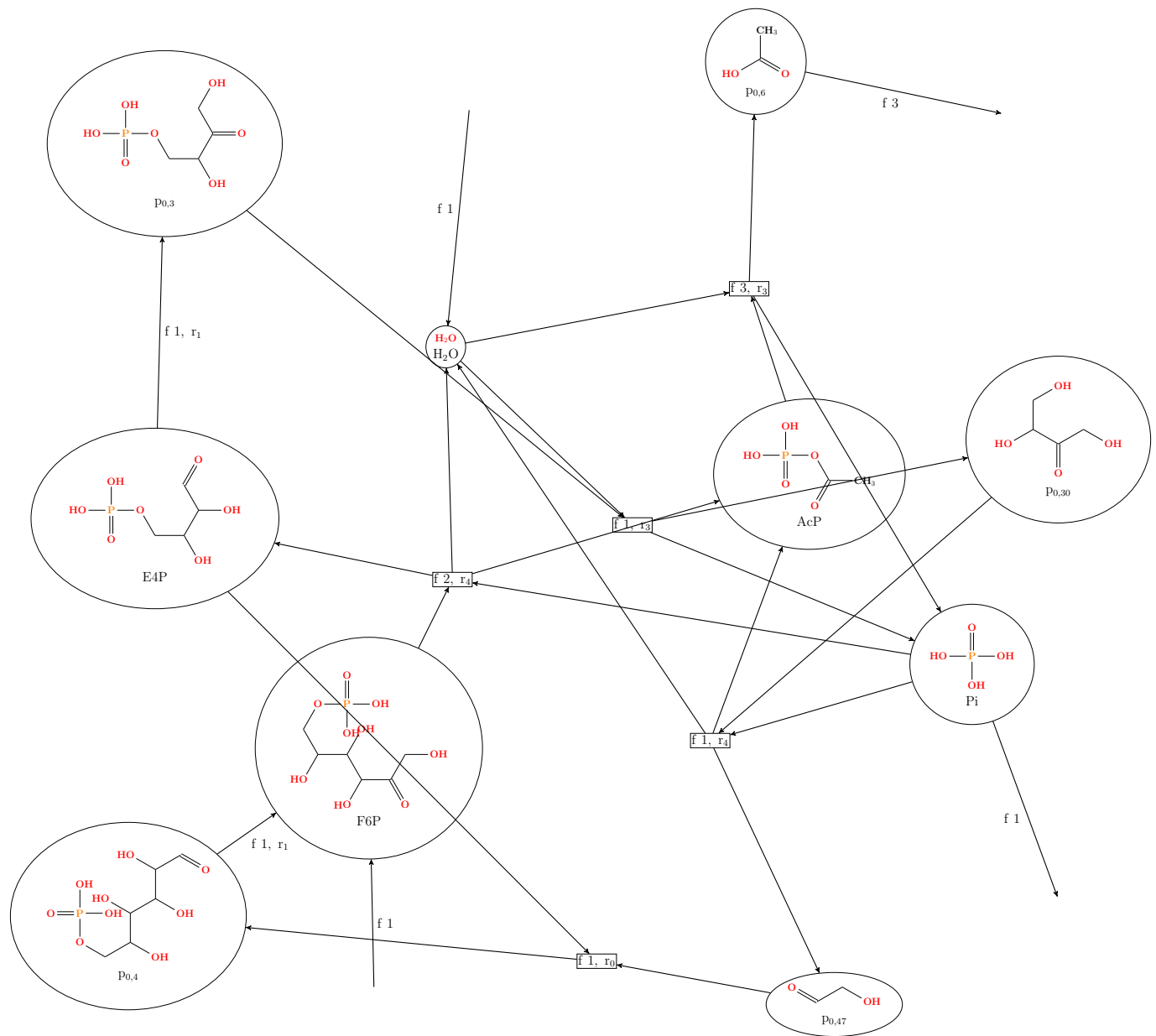
Objective value (integral): 10

Vertex/Graph In Out

F6P	1	0
-----	---	---

H_20	1	0
Pi	0	1
p_{0,6}	0	3

## Filtered Graph



File: out/233\_dg\_0\_11100\_f\_0\_26\_filt

$|E| = 7$   $|P| = 10$

## 0.6.5 Solution 27

### Overall Data

Objective value (integral): 10

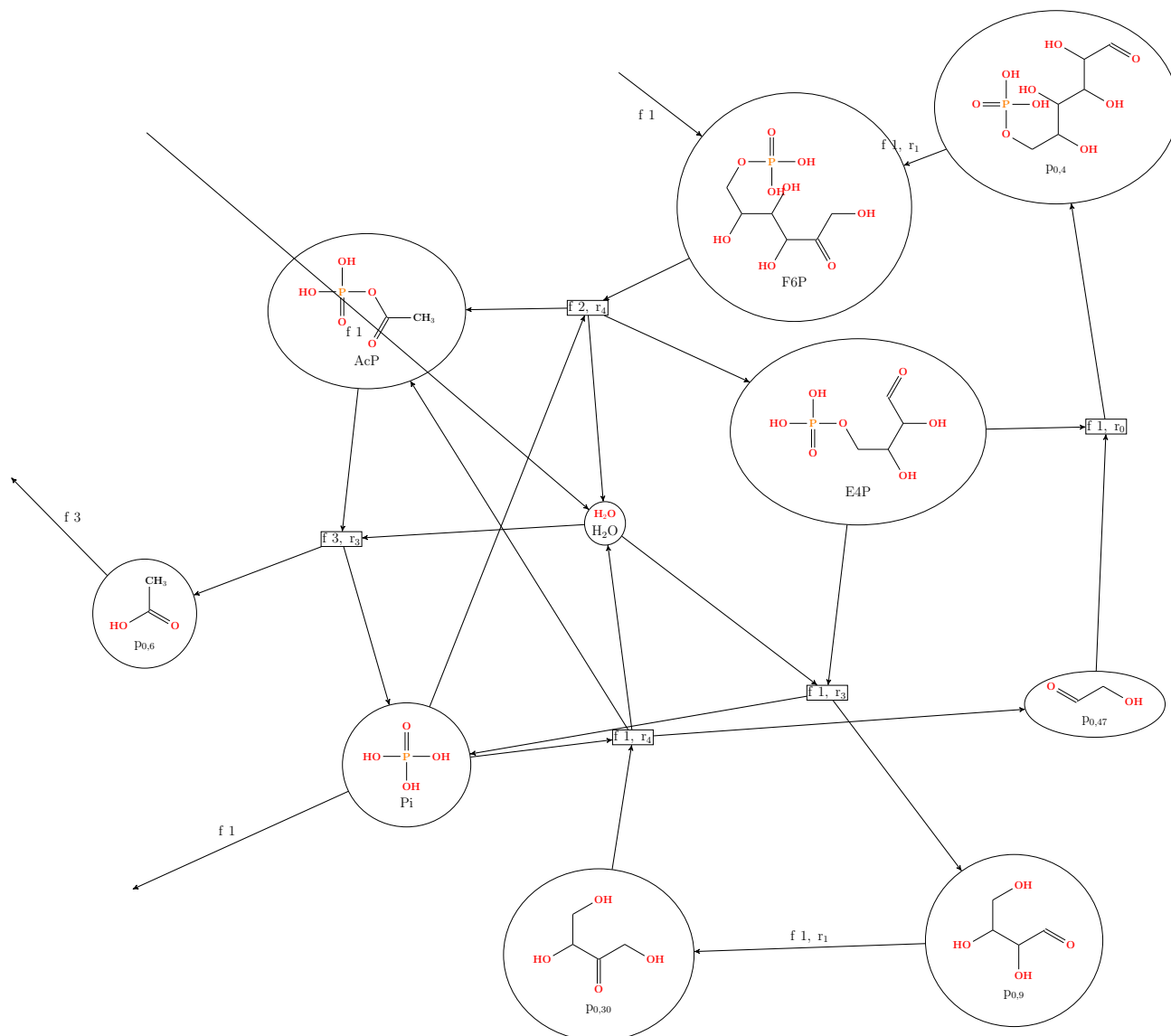
Vertex/Graph In Out

F6P	1	0
H_20	1	0



Pi	0	1
p_{0,6}	0	3

## Filtered Graph



File: out/238\_dg\_0\_11100\_f\_0\_27\_filt

$|E| = 7$   $|P| = 10$

## 0.6.6 Solution 44

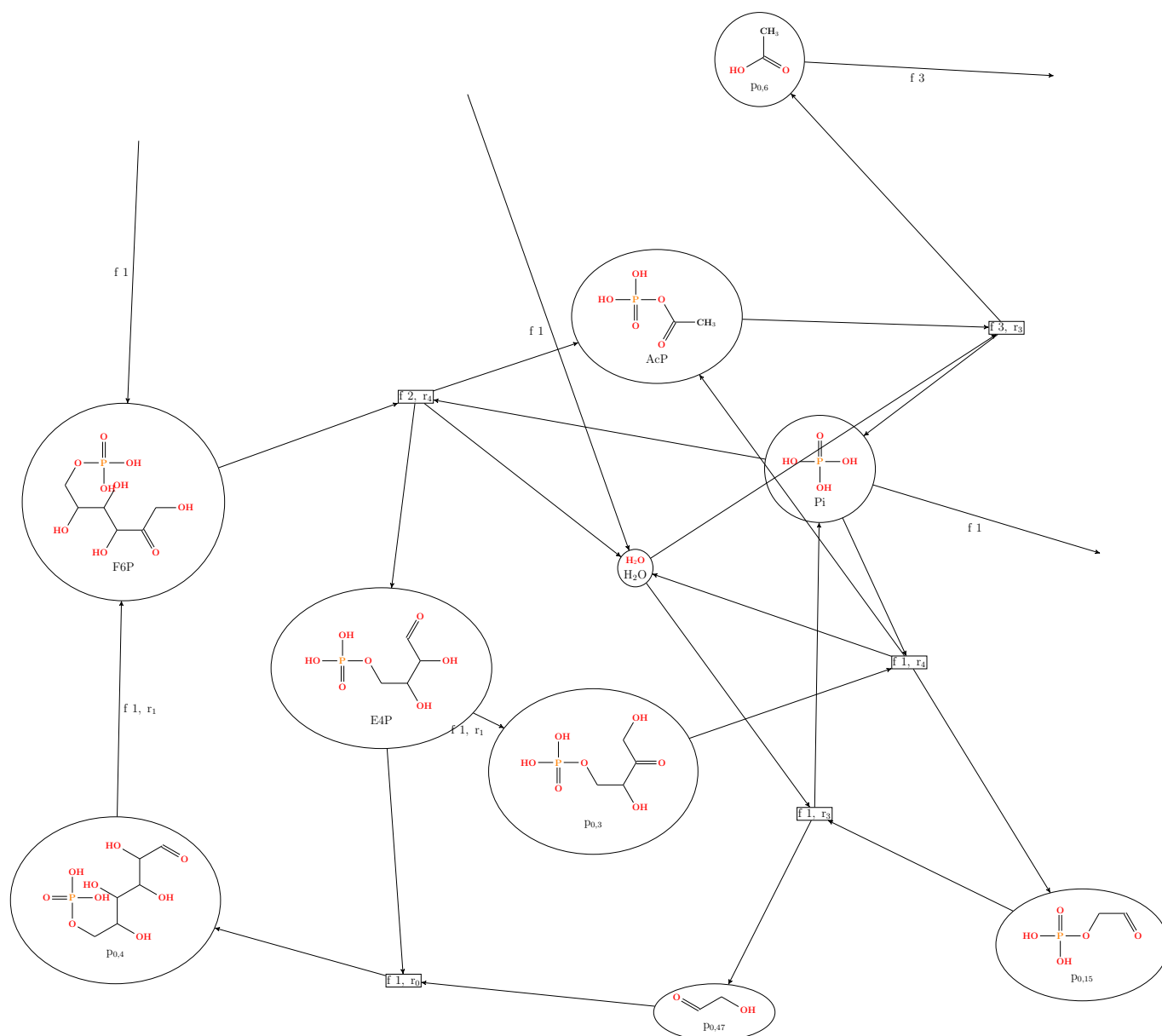
### Overall Data

Objective value (integral): 10

Vertex/Graph In Out

F6P	1	0
H_20	1	0
Pi	0	1
p_{0,6}	0	3

## Filtered Graph



File: out/243\_dg\_0\_11100\_f\_0\_44\_filt

$|E| = 7$   $|P| = 10$

## 0.7 Enumerated Flows with 8 unique reactions

### 0.7.1 Solution 0

#### Overall Data

Objective value (integral): 10

Vertex/Graph In Out

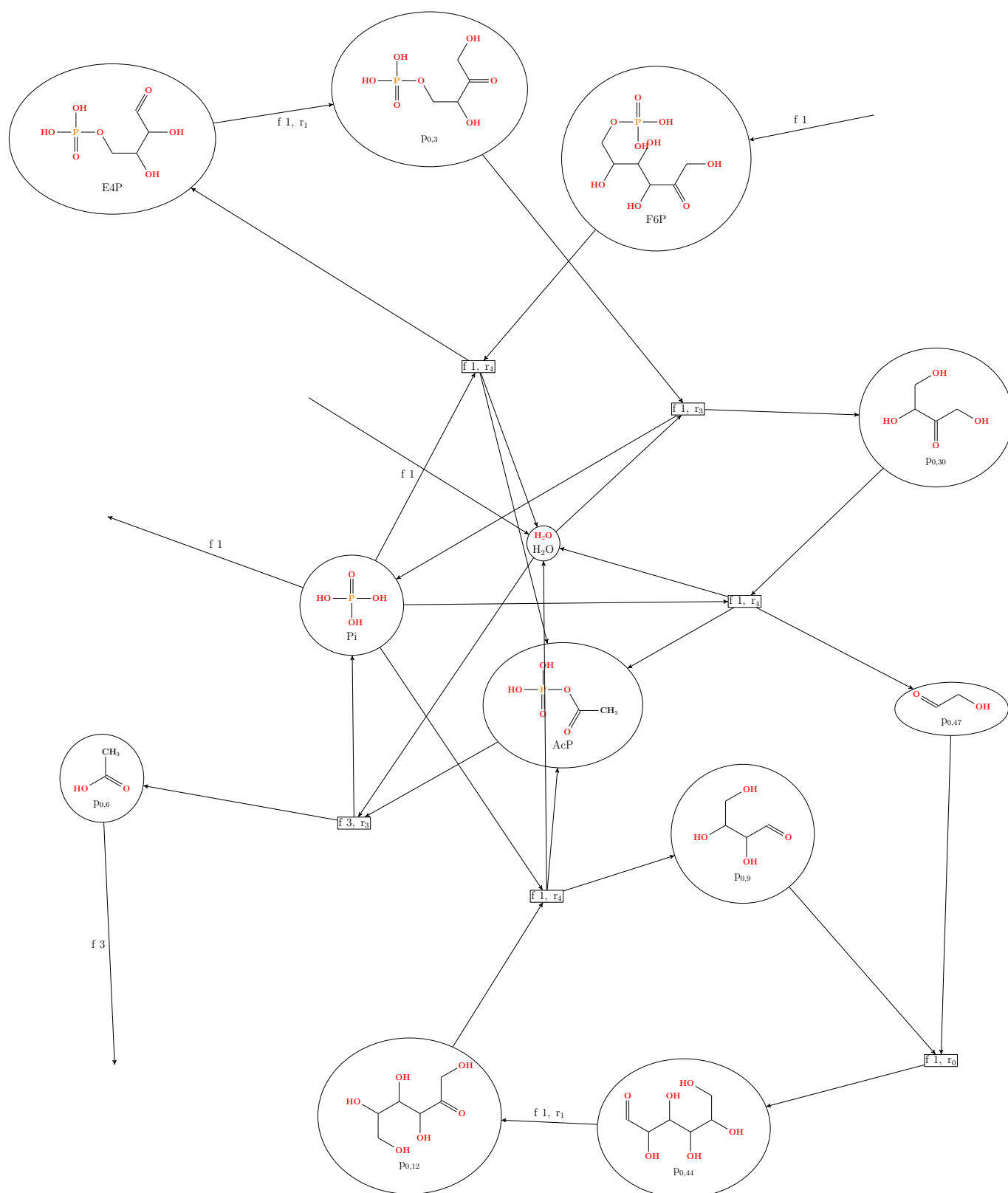
F6P 1 0

H<sub>2</sub>O 1 0

Pi 0 1

p<sub>{0,6}</sub> 0 3

## Filtered Graph



File: out/248\_dg\_0\_11100\_f\_0\_0\_filt

$|E| = 8$   $|P| = 10$

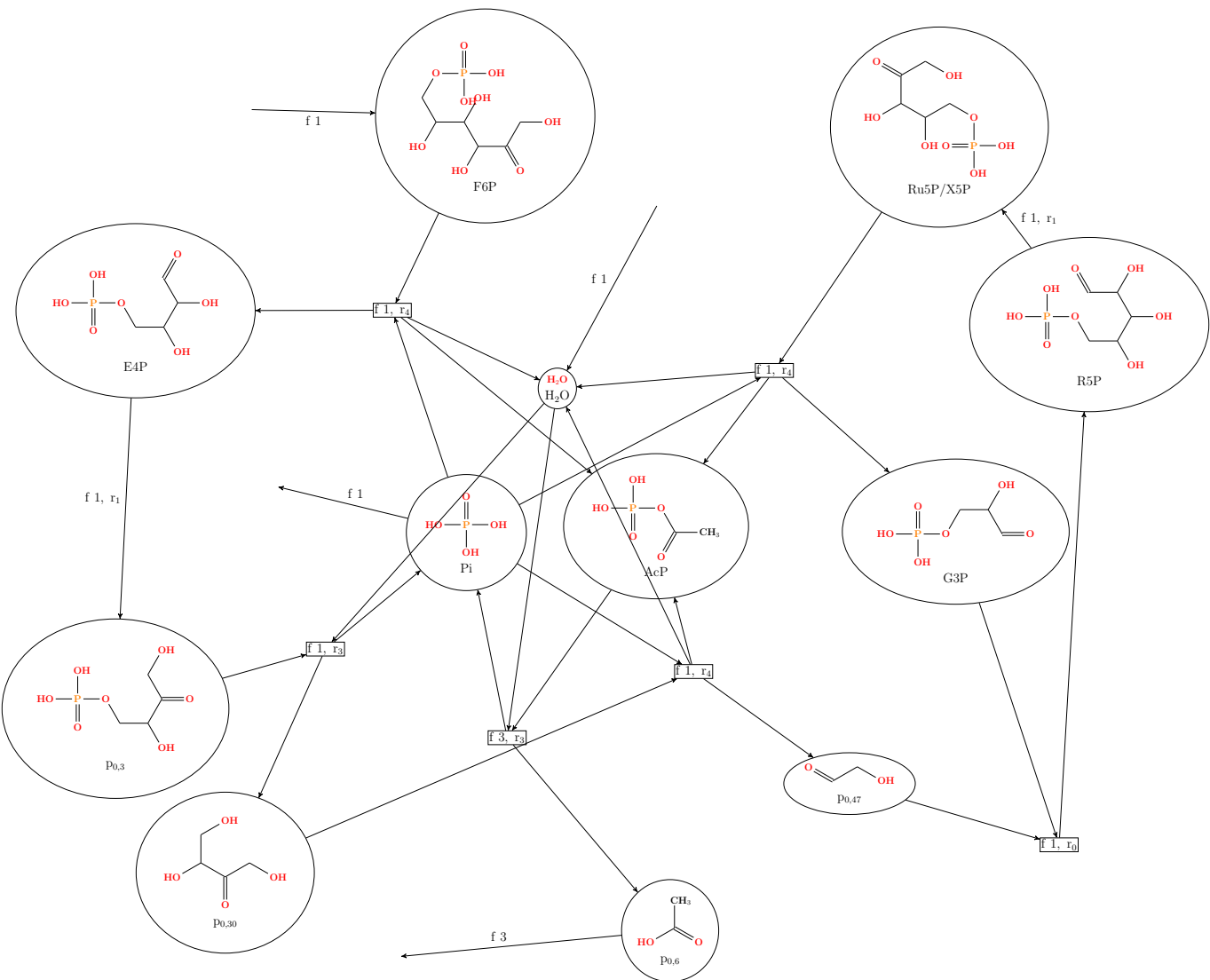
# 0.7.2 Solution 2

## Overall Data

Objective value (integral): 10

Vertex/Graph	In	Out
F6P	1	0
H_2O	1	0
Pi	0	1
p_{0,6}	0	3

## Filtered Graph



File: out/253\_dg\_0\_11100\_f\_0\_2\_filt

$|E| = 8 \quad |P| = 10$

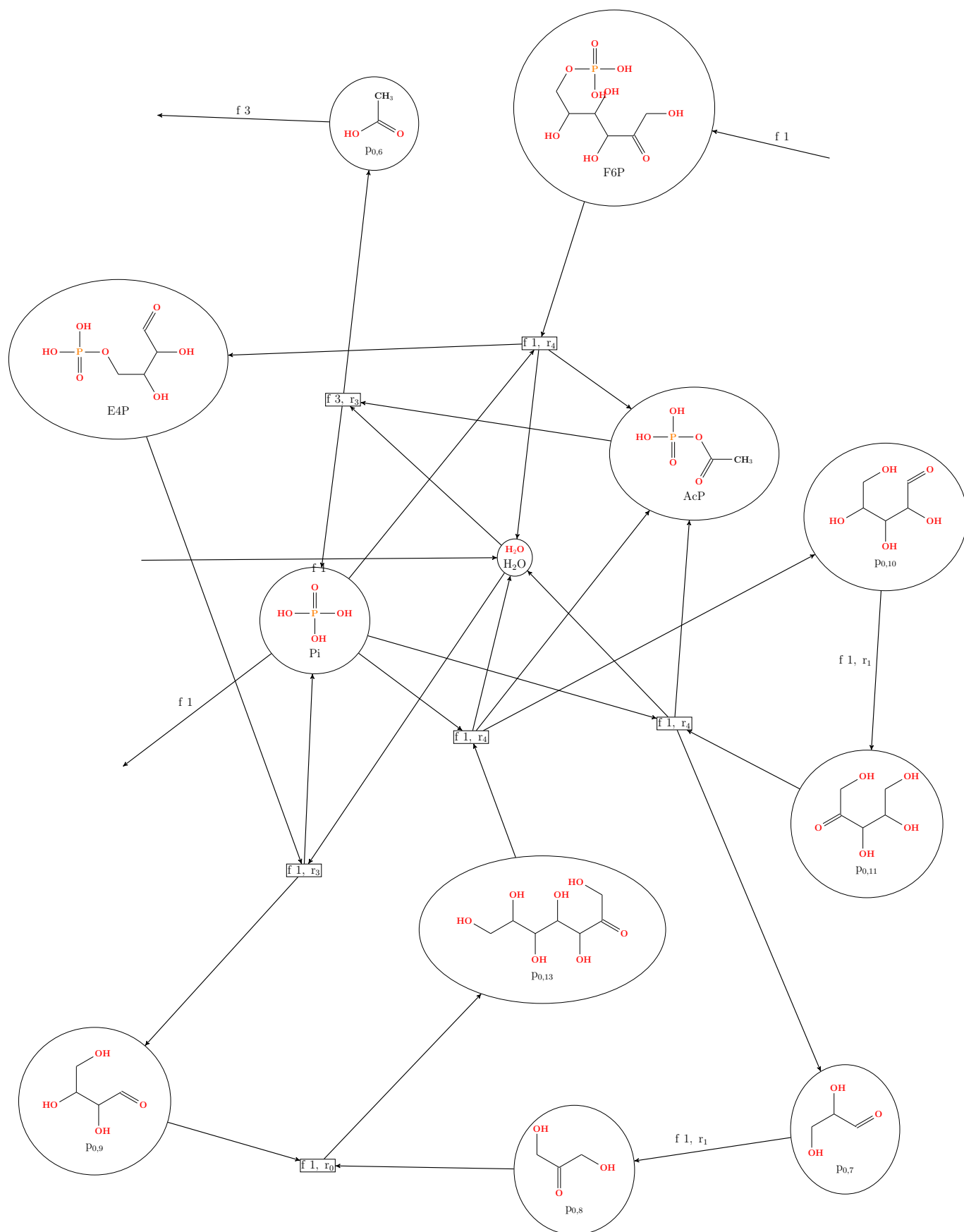
# 0.7.3 Solution 3

## Overall Data

Objective value (integral): 10

Vertex/Graph	In	Out
F6P	1	0
H_20	1	0
Pi	0	1
p_{0,6}	0	3

## Filtered Graph



File: out/258\_dg\_0\_11100\_f\_0\_3\_filt

$$|E| = 8 \quad |P| = 10$$

## 0.7.4 Solution 4

### Overall Data

Objective value (integral): 10

Vertex/Graph In Out

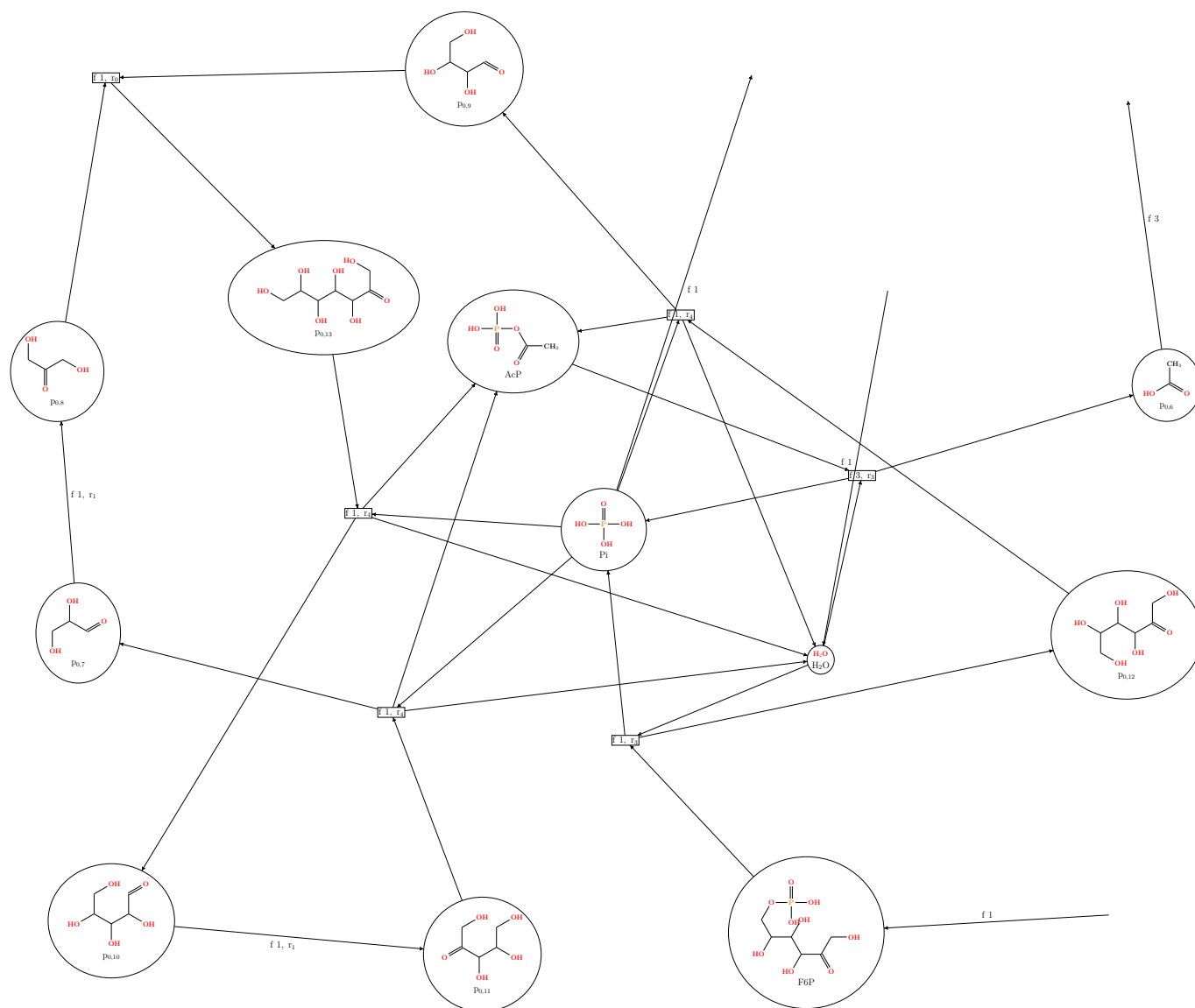
F6P 1 0

H<sub>2</sub>O 1 0

Pi 0 1

p<sub>{0,6}</sub> 0 3

### Filtered Graph



File: out/263\_dg\_0\_11100\_f\_0\_4\_filt

$$|E| = 8 \quad |P| = 10$$

## 0.7.5 Solution 5

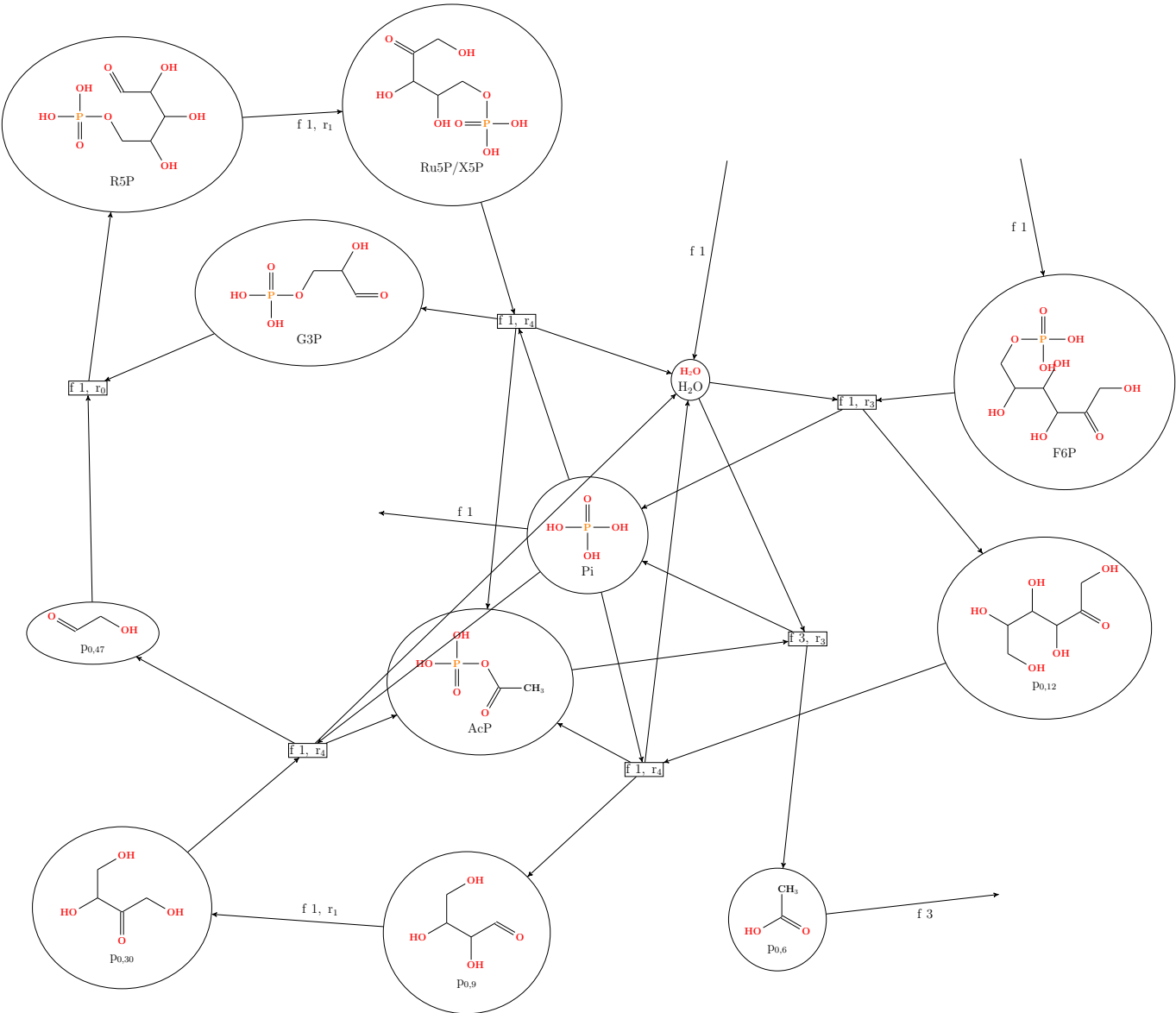
### Overall Data

Objective value (integral): 10





Filtered Graph



File: out/273\_dg\_0\_11100\_f\_0\_6\_filt

$|E| = 8 \quad |P| = 10$

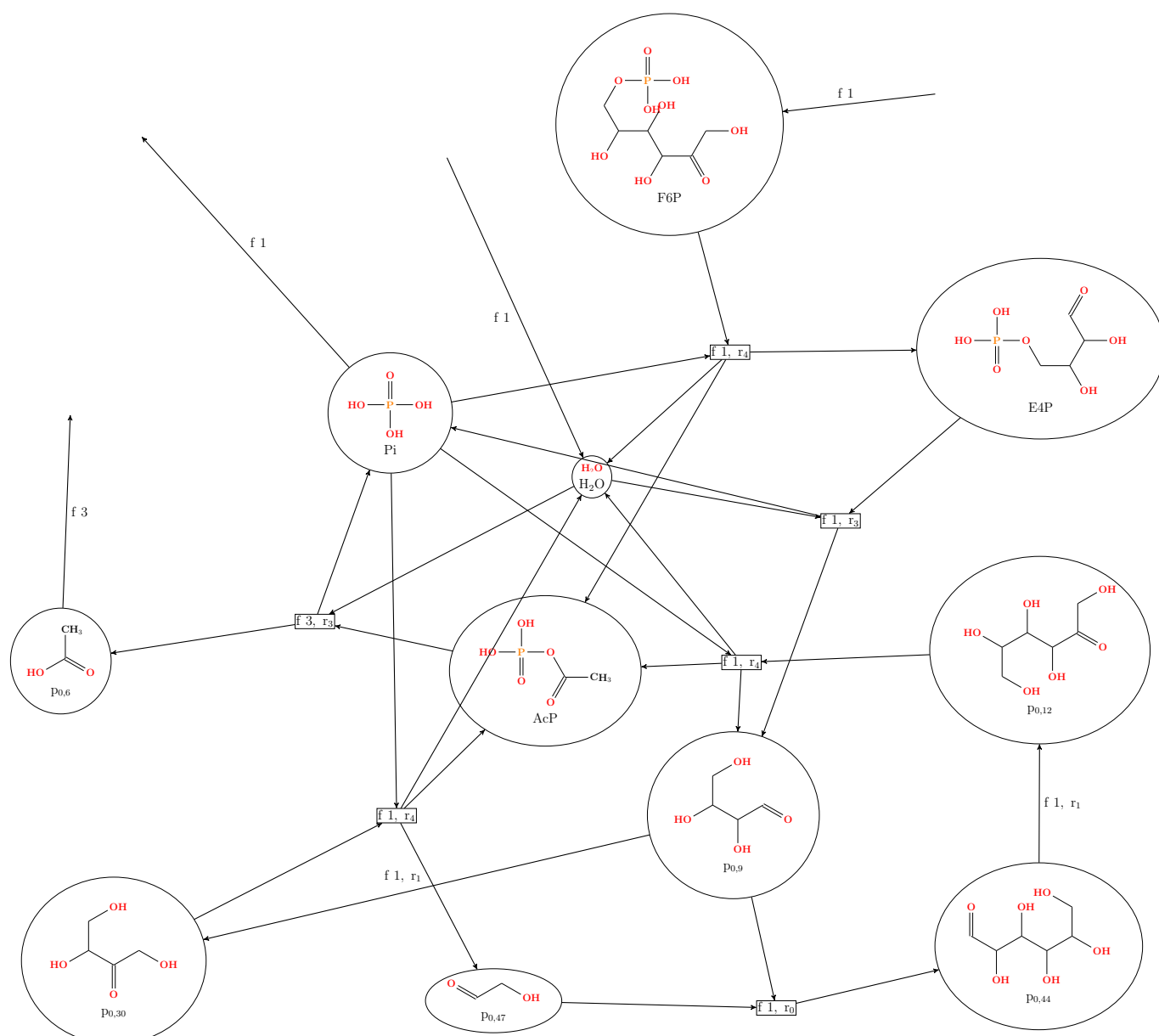
0.7.7 Solution 9

Overall Data

Objective value (integral): 10

Vertex/Graph	In	Out
F6P	1	0
H_20	1	0
Pi	0	1
p_{0,6}	0	3

## Filtered Graph



File: out/278\_dg\_0\_11100\_f\_0\_9\_filt

$$|\mathbf{E}| = 8 \quad |\mathbf{P}| = 10$$

### 0.7.8 Solution 11

## Overall Data

Objective value (integral): 10

Vertex/Graph	In	Out
1	0	0
2	0	0
3	0	0
4	0	0
5	0	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0
17	0	0
18	0	0
19	0	0
20	0	0
21	0	0
22	0	0
23	0	0
24	0	0
25	0	0
26	0	0
27	0	0
28	0	0
29	0	0
30	0	0
31	0	0
32	0	0
33	0	0
34	0	0
35	0	0
36	0	0
37	0	0
38	0	0
39	0	0
40	0	0
41	0	0
42	0	0
43	0	0
44	0	0
45	0	0
46	0	0
47	0	0
48	0	0
49	0	0
50	0	0
51	0	0
52	0	0
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54	0	0
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56	0	0
57	0	0
58	0	0
59	0	0
60	0	0
61	0	0
62	0	0
63	0	0
64	0	0
65	0	0
66	0	0
67	0	0
68	0	0
69	0	0
70	0	0
71	0	0
72	0	0
73	0	0
74	0	0
75	0	0
76	0	0
77	0	0
78	0	0
79	0	0
80	0	0
81	0	0
82	0	0
83	0	0
84	0	0
85	0	0
86	0	0
87	0	0
88	0	0
89	0	0
90	0	0
91	0	0
92	0	0
93	0	0
94	0	0
95	0	0
96	0	0
97	0	0
98	0	0
99	0	0
100	0	0

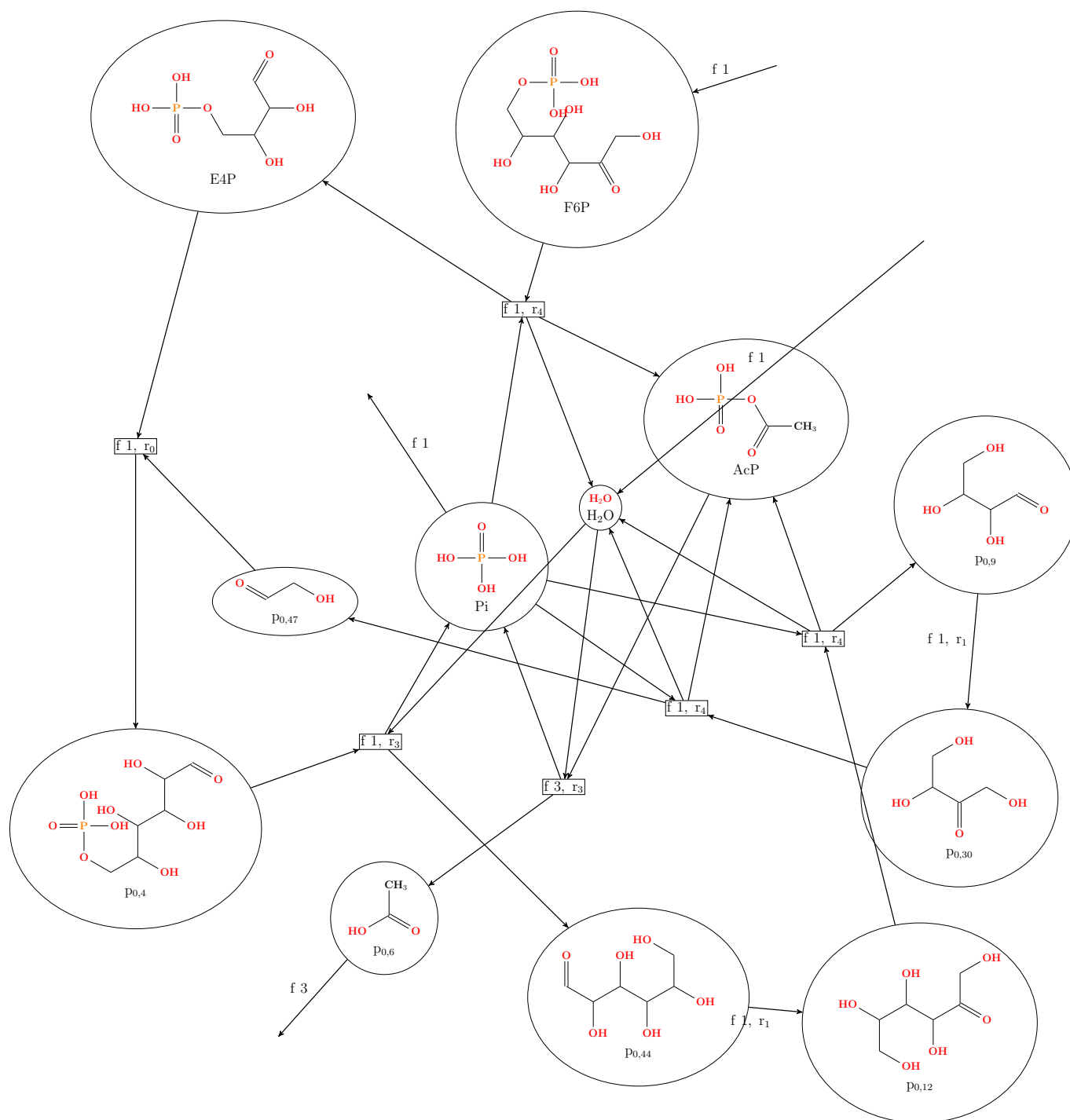
F6P	1	0
-----	---	---

H_20	1	0
------	---	---

Pi	0	1
----	---	---

p\_{0,6}            0    3

## Filtered Graph



File: out/283\_dg\_0\_11100\_f\_0\_11\_filt

$$|\mathbf{E}| = 8 \quad |\mathbf{P}| = 10$$

### 0.7.9 Solution 12

## Overall Data

Objective value (integral): 10

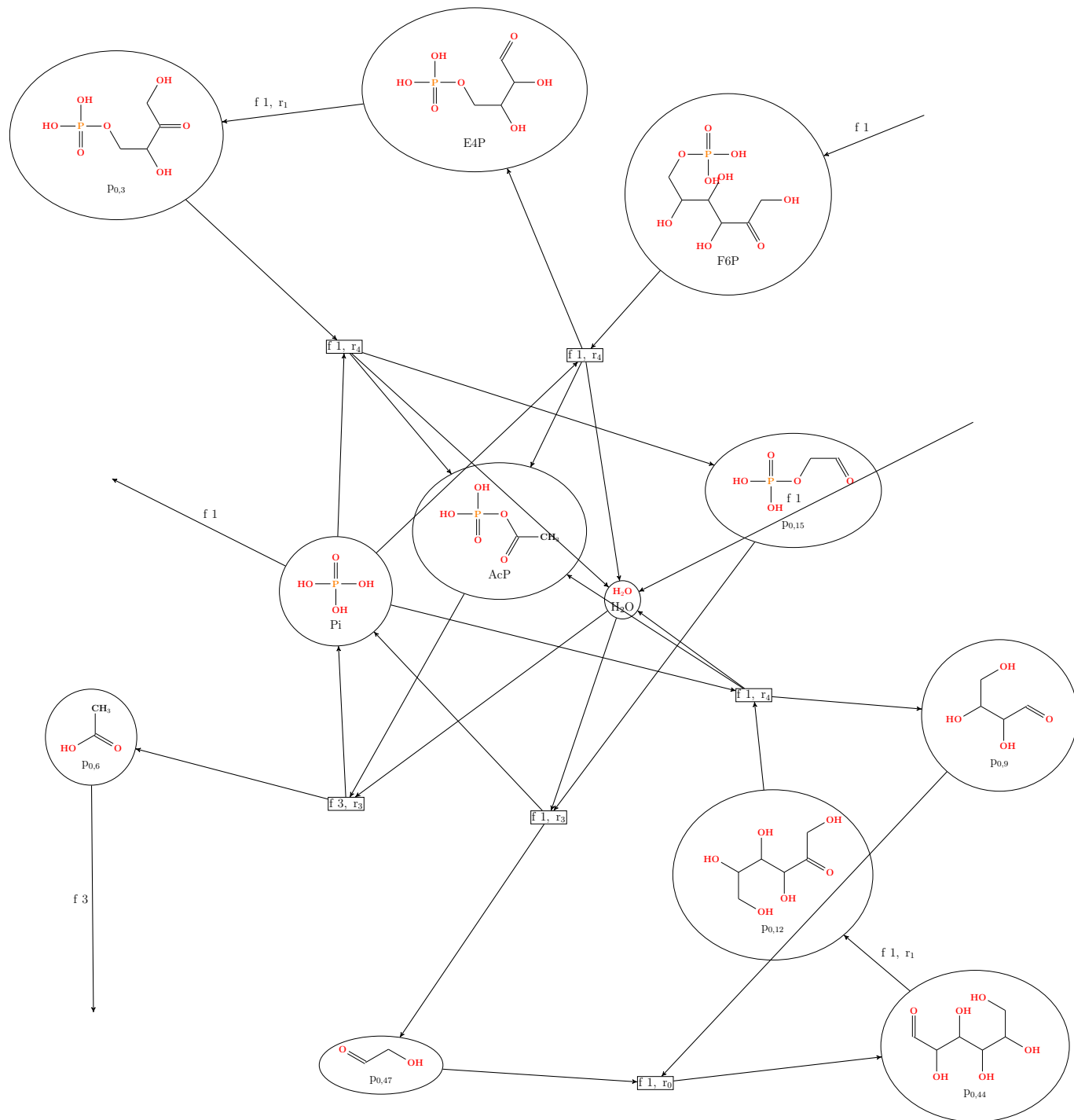
Vertex/Graph	In	Out
1	0	0
2	0	0
3	0	0
4	0	0
5	0	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0
17	0	0
18	0	0
19	0	0
20	0	0
21	0	0
22	0	0
23	0	0
24	0	0
25	0	0
26	0	0
27	0	0
28	0	0
29	0	0
30	0	0
31	0	0
32	0	0
33	0	0
34	0	0
35	0	0
36	0	0
37	0	0
38	0	0
39	0	0
40	0	0
41	0	0
42	0	0
43	0	0
44	0	0
45	0	0
46	0	0
47	0	0
48	0	0
49	0	0
50	0	0
51	0	0
52	0	0
53	0	0
54	0	0
55	0	0
56	0	0
57	0	0
58	0	0
59	0	0
60	0	0
61	0	0
62	0	0
63	0	0
64	0	0
65	0	0
66	0	0
67	0	0
68	0	0
69	0	0
70	0	0
71	0	0
72	0	0
73	0	0
74	0	0
75	0	0
76	0	0
77	0	0
78	0	0
79	0	0
80	0	0
81	0	0
82	0	0
83	0	0
84	0	0
85	0	0
86	0	0
87	0	0
88	0	0
89	0	0
90	0	0
91	0	0
92	0	0
93	0	0
94	0	0
95	0	0
96	0	0
97	0	0
98	0	0
99	0	0
100	0	0
101	0	0
102	0	0
103	0	0
104	0	0
105	0	0
106	0	0
107	0	0
108	0	0
109	0	0
110	0	0
111	0	0
112	0	0
113	0	0
114	0	0
115	0	0
116	0	0
117	0	0
118	0	0
119	0	0
120	0	0
121	0	0
122	0	0
123	0	0
124	0	0
125	0	0
126	0	0
127	0	0
128	0	0
129	0	0
130	0	0
131	0	0
132	0	0
133	0	0
134	0	0
135	0	0
136	0	0
137	0	0
138	0	0
139	0	

F6P	1	0
-----	---	---

H\_20                    1   0

Pi	0	1
p_{0,6}	0	3

## Filtered Graph



File: out/288\_dg\_0\_11100\_f\_0\_12\_filt

$$|\mathbf{E}| = 8 \quad |\mathbf{P}| = 10$$

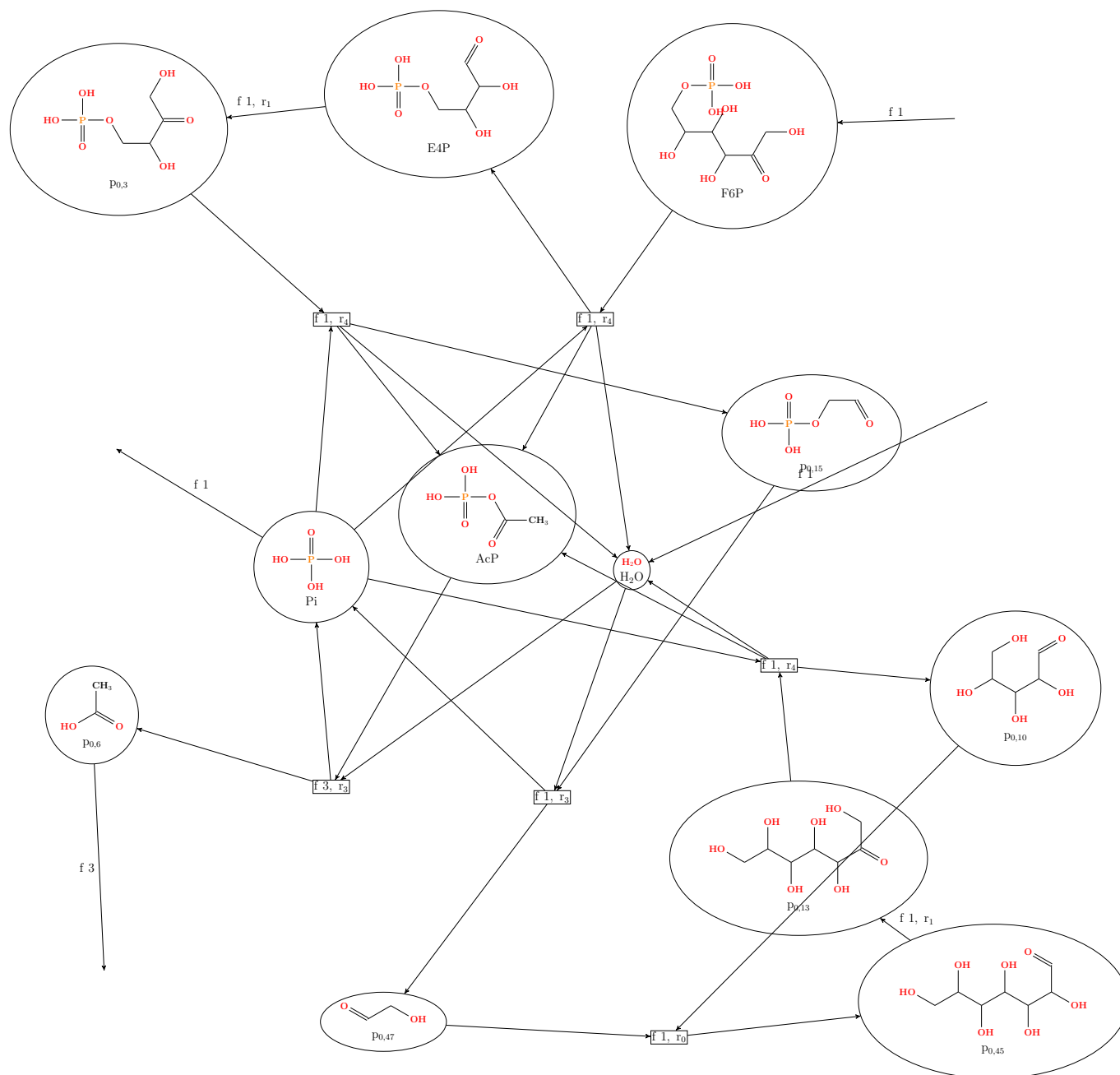
### 0.7.10 Solution 13

## Overall Data

Objective value (integral): 10

Vertex/Graph	In	Out
F6P	1	0
H_2O	1	0
Pi	0	1
p_{0,6}	0	3

## Filtered Graph



File: out/293\_dg\_0\_11100\_f\_0\_13\_filt

$$|E| = 8 \quad |P| = 10$$

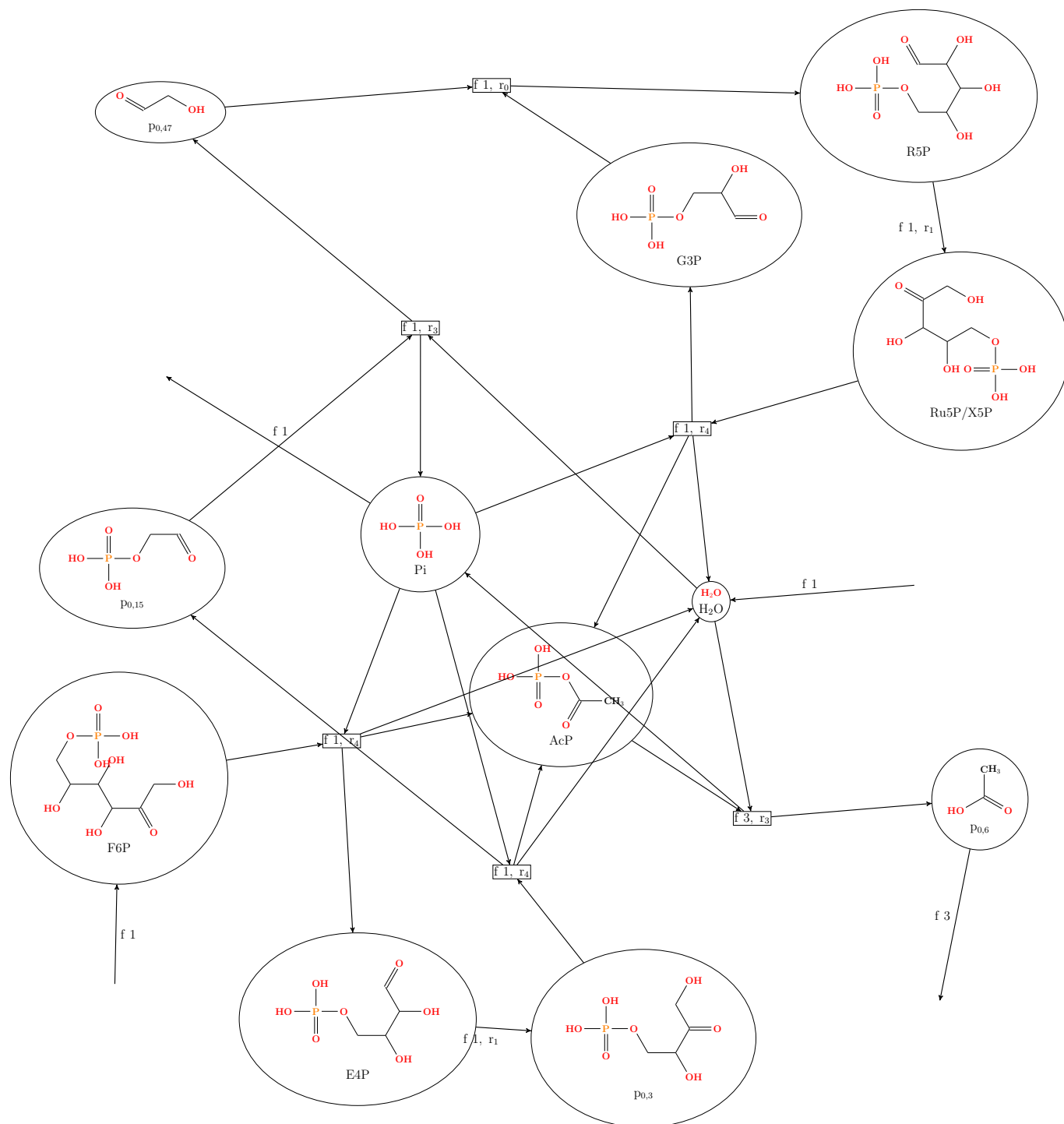
## 0.7.11 Solution 15

### Overall Data

Objective value (integral): 10

Vertex/Graph	In	Out
F6P	1	0
H_2O	1	0
Pi	0	1
p_{0,6}	0	3

## Filtered Graph



File: out/298\_dg\_0\_11100\_f\_0\_15\_filt

$$|E| = 8 \quad |P| = 10$$

## 0.7.12 Solution 16

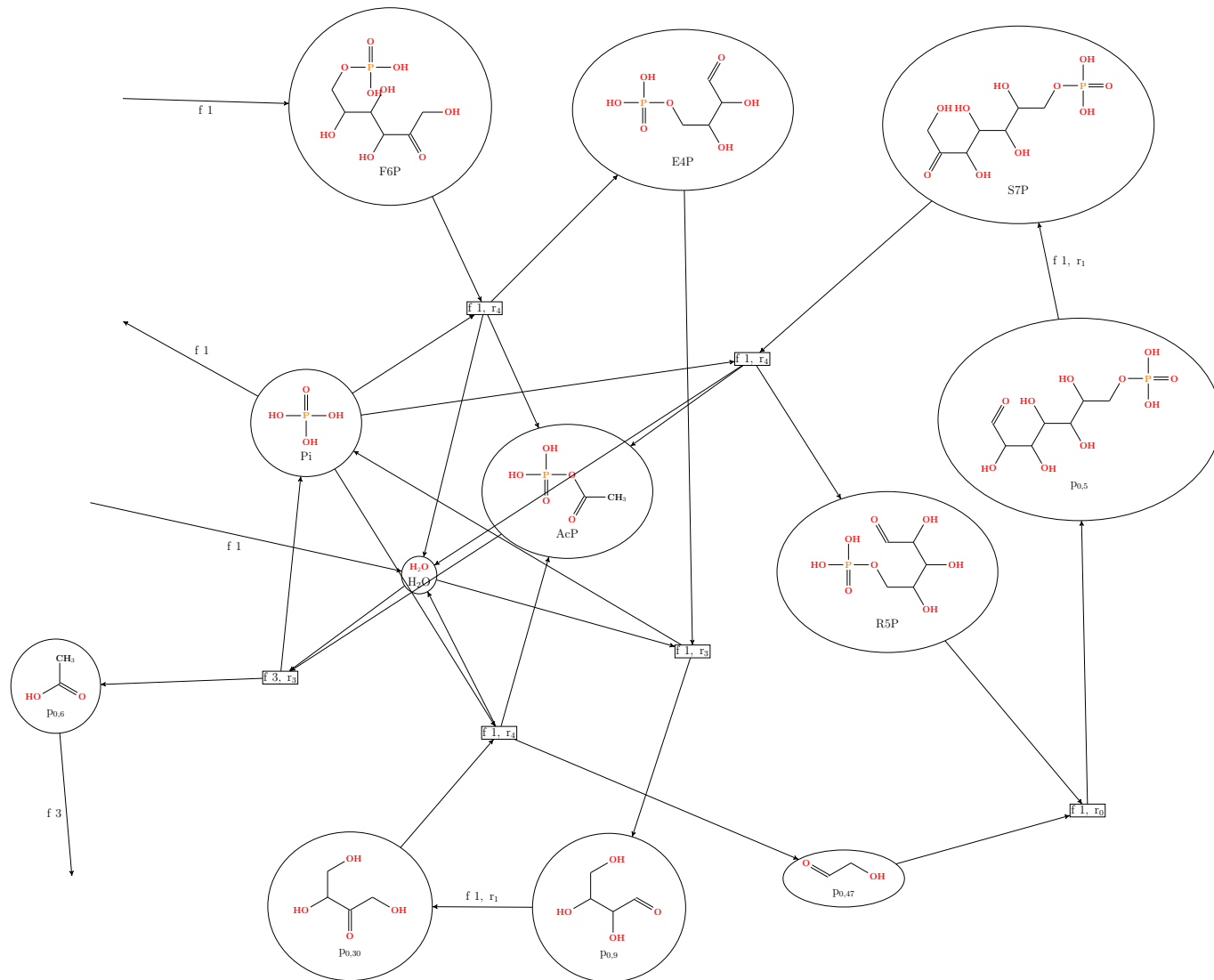
### Overall Data

Objective value (integral): 10

Vertex/Graph In Out

F6P	1	0
H <sub>2</sub> O	1	0
Pi	0	1
p <sub>{0,6}</sub>	0	3

### Filtered Graph



File: out/303\_dg\_0\_11100\_f\_0\_16\_filt

$$|E| = 8 \quad |P| = 10$$

## 0.7.13 Solution 17

### Overall Data

Objective value (integral): 10

Vertex/Graph In Out





## 0.7.14 Solution 18

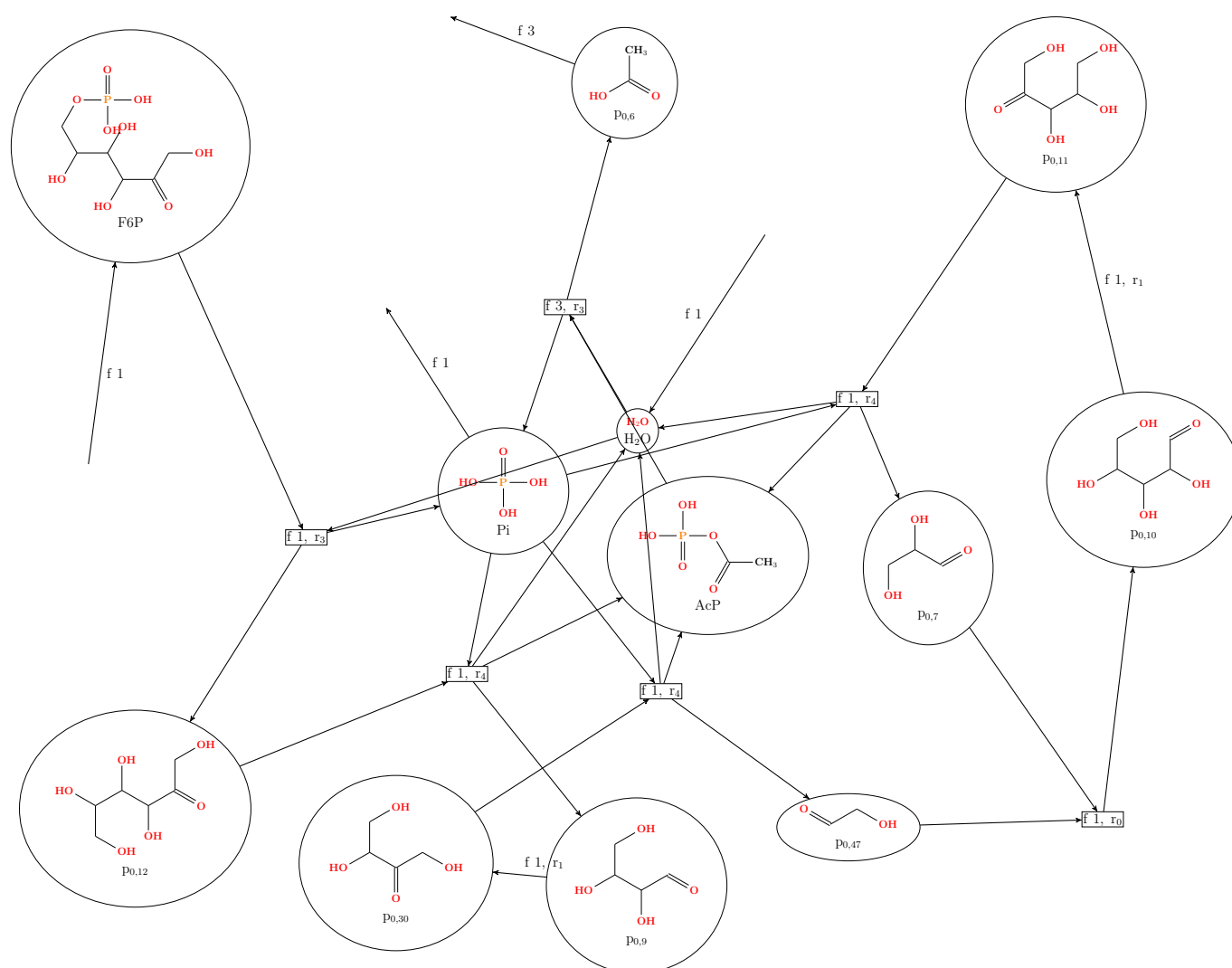
### Overall Data

Objective value (integral): 10

Vertex/Graph In Out

F6P	1	0
H <sub>2</sub> O	1	0
Pi	0	1
p <sub>{0,6}</sub>	0	3

### Filtered Graph



File: out/313\_dg\_0\_11100\_f\_0\_18\_filt

$$|E| = 8 \quad |P| = 10$$

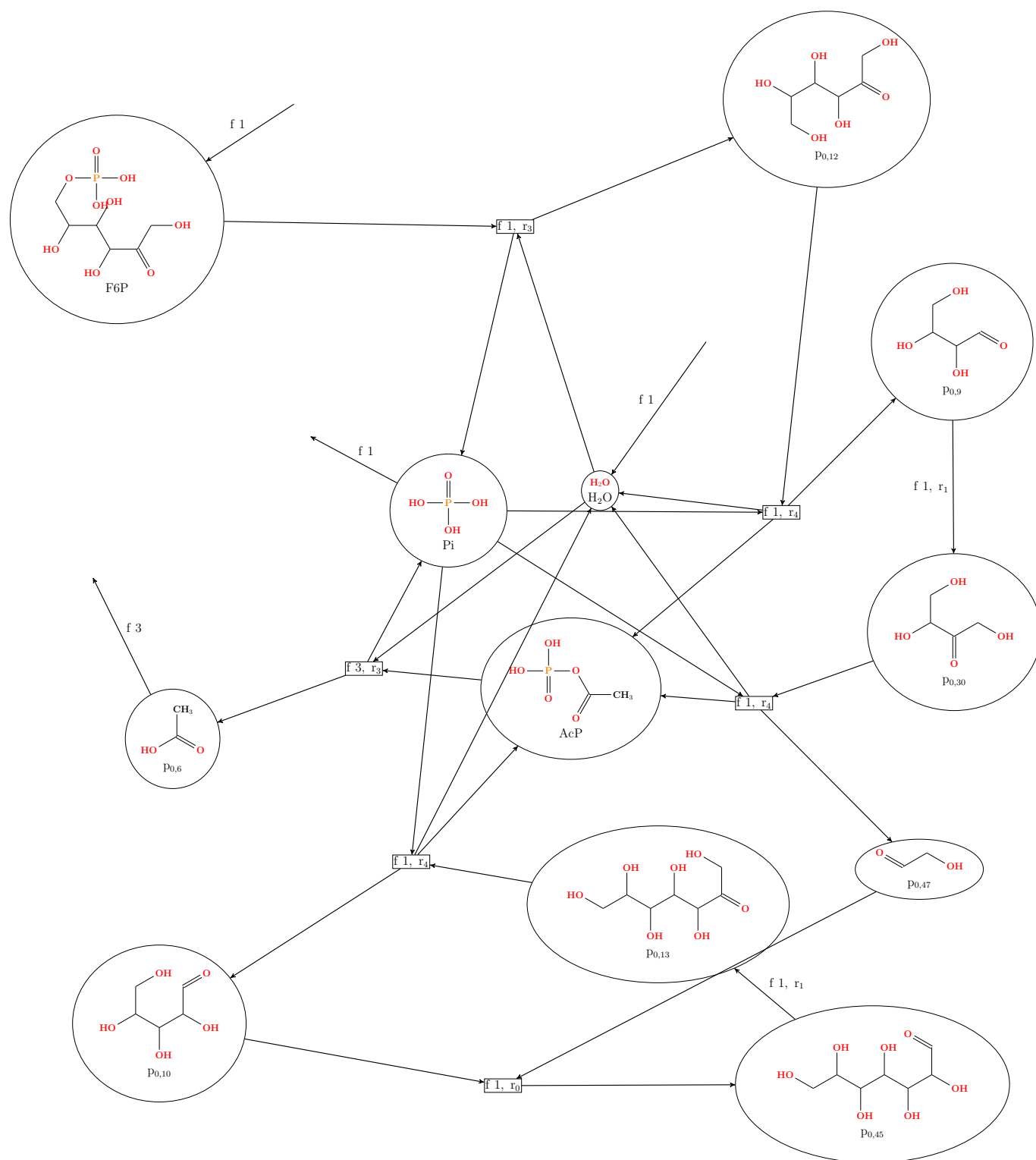
## 0.7.15 Solution 19

### Overall Data

Objective value (integral): 10

Vertex/Graph	In	Out
F6P	1	0
H <sub>2</sub> O	1	0
Pi	0	1
p <sub>{0,6}</sub>	0	3

## Filtered Graph



File: out/318\_dg\_0\_11100\_f\_0\_19\_filt

$$|E| = 8 \quad |P| = 10$$

## 0.7.16 Solution 21

### Overall Data

Objective value (integral): 10

Vertex/Graph	In	Out
--------------	----	-----

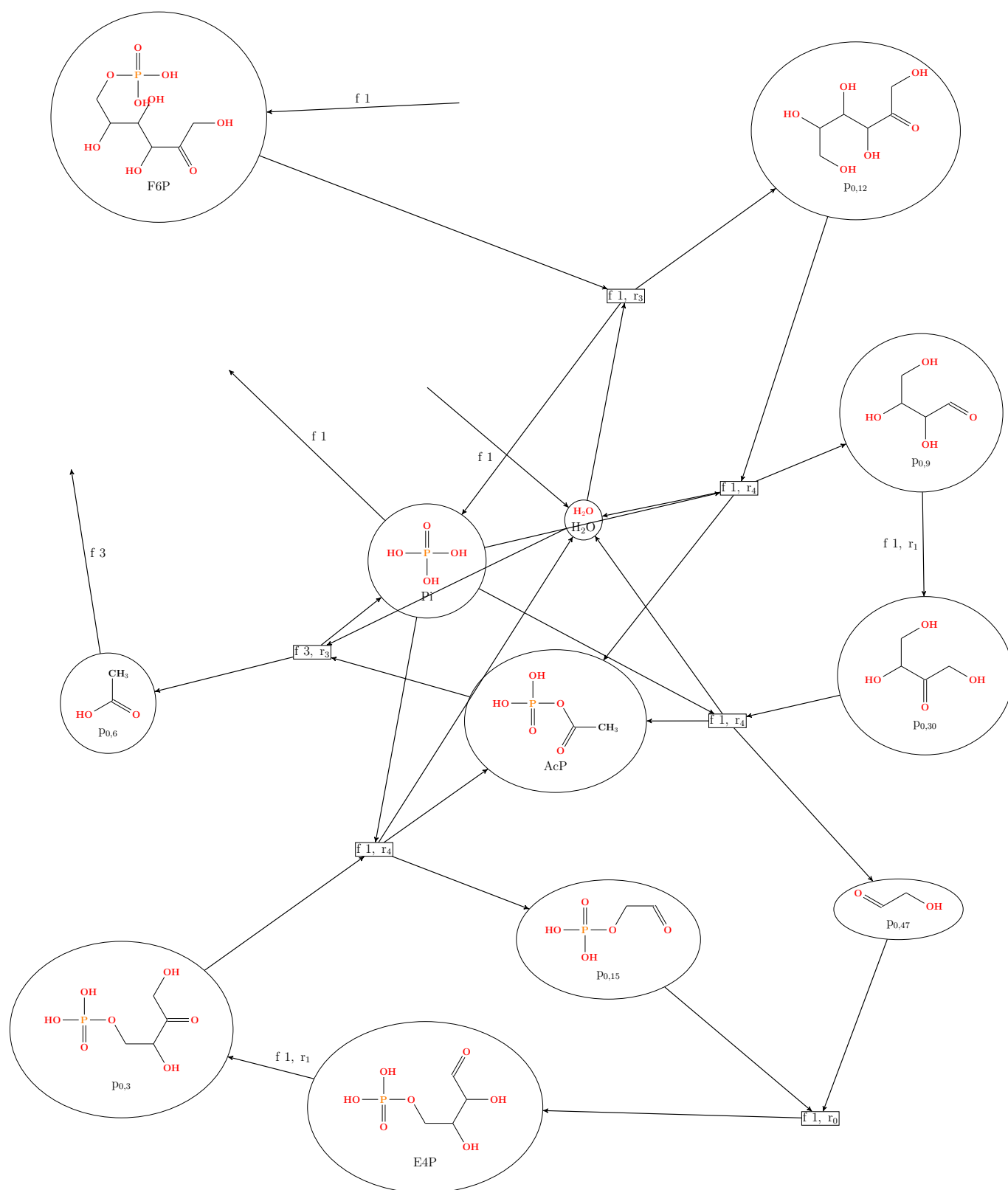
F6P	1	0
-----	---	---

H_20	1	0
------	---	---

Pi	0	1
----	---	---

p_{0,6}	0	3
---------	---	---

## Filtered Graph



File: out/323\_dg\_0\_11100\_f\_0\_21\_filt

$|E| = 8 \quad |P| = 10$

### 0.7.17 Solution 22

## Overall Data

Objective value (integral): 10

Vertex/Graph	In	Out
1	0	0
2	0	0
3	0	0
4	0	0
5	0	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0
17	0	0
18	0	0
19	0	0
20	0	0
21	0	0
22	0	0
23	0	0
24	0	0
25	0	0
26	0	0
27	0	0
28	0	0
29	0	0
30	0	0
31	0	0
32	0	0
33	0	0
34	0	0
35	0	0
36	0	0
37	0	0
38	0	0
39	0	0
40	0	0
41	0	0
42	0	0
43	0	0
44	0	0
45	0	0
46	0	0
47	0	0
48	0	0
49	0	0
50	0	0
51	0	0
52	0	0
53	0	0
54	0	0
55	0	0
56	0	0
57	0	0
58	0	0
59	0	0
60	0	0
61	0	0
62	0	0
63	0	0
64	0	0
65	0	0
66	0	0
67	0	0
68	0	0
69	0	0
70	0	0
71	0	0
72	0	0
73	0	0
74	0	0
75	0	0
76	0	0
77	0	0
78	0	0
79	0	0
80	0	0
81	0	0
82	0	0
83	0	0
84	0	0
85	0	0
86	0	0
87	0	0
88	0	0
89	0	0
90	0	0
91	0	0
92	0	0
93	0	0
94	0	0
95	0	0
96	0	0
97	0	0
98	0	0
99	0	0
100	0	0
101	0	0
102	0	0
103	0	0
104	0	0
105	0	0
106	0	0
107	0	0
108	0	0
109	0	0
110	0	0
111	0	0
112	0	0
113	0	0
114	0	0
115	0	0
116	0	0
117	0	0
118	0	0
119	0	0
120	0	0
121	0	0
122	0	0
123	0	0
124	0	0
125	0	0
126	0	0
127	0	0
128	0	0
129	0	0
130	0	0
131	0	0
132	0	0
133	0	0
134	0	0
135	0	0
136	0	0
137	0	0
138	0	0
139	0	

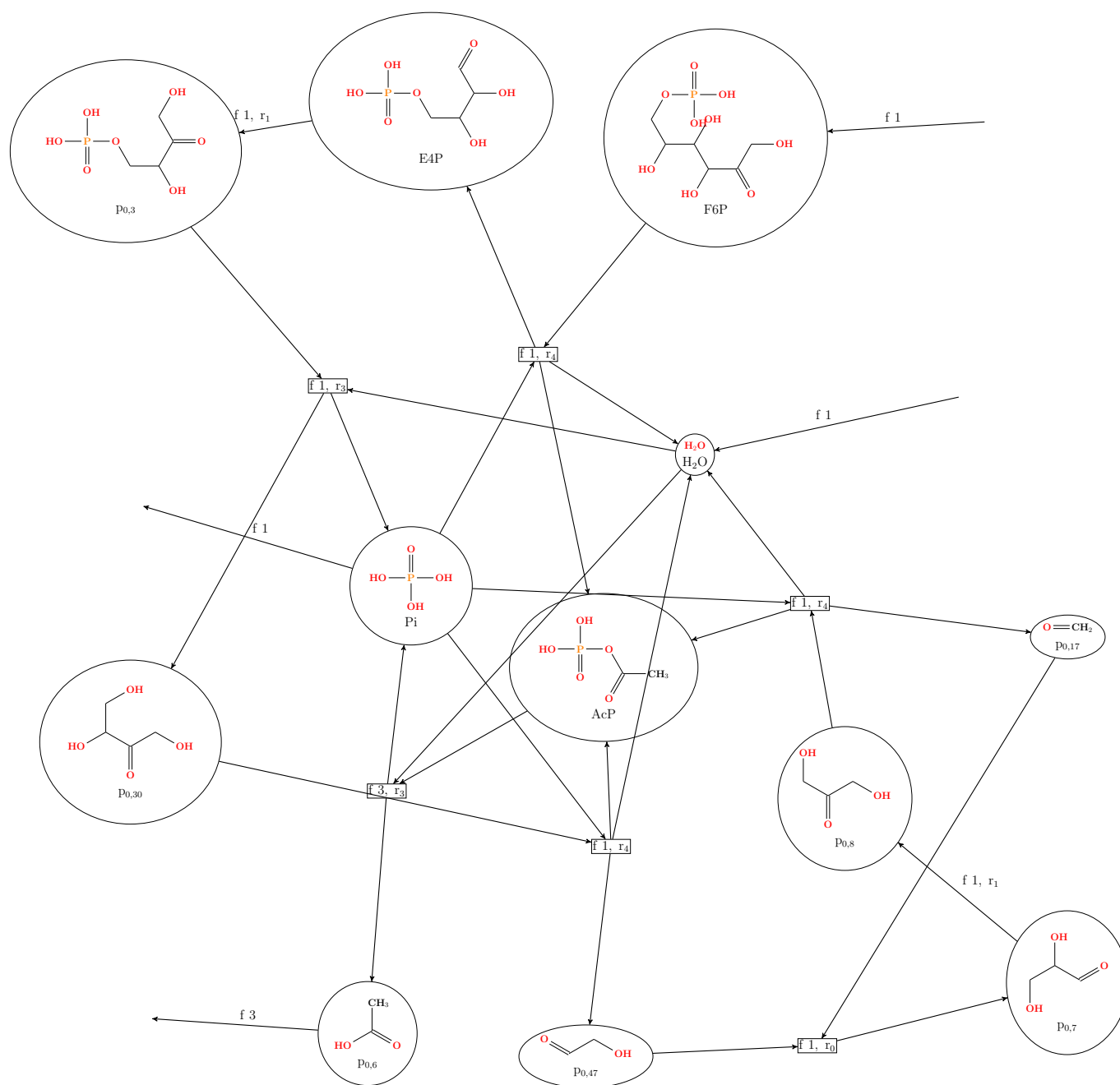
F6P	1	0
-----	---	---

H\_20                    1   0

Pi	0	1
----	---	---

$$p_{\{0,6\}} \quad 0 \quad 3$$

## Filtered Graph



File: out/328\_dg\_0\_11100\_f\_0\_22\_filt

$$|\mathbf{E}| = 8 \quad |\mathbf{P}| = 10$$

## 0.7.18 Solution 23

### Overall Data

Objective value (integral): 10

Vertex/Graph In Out

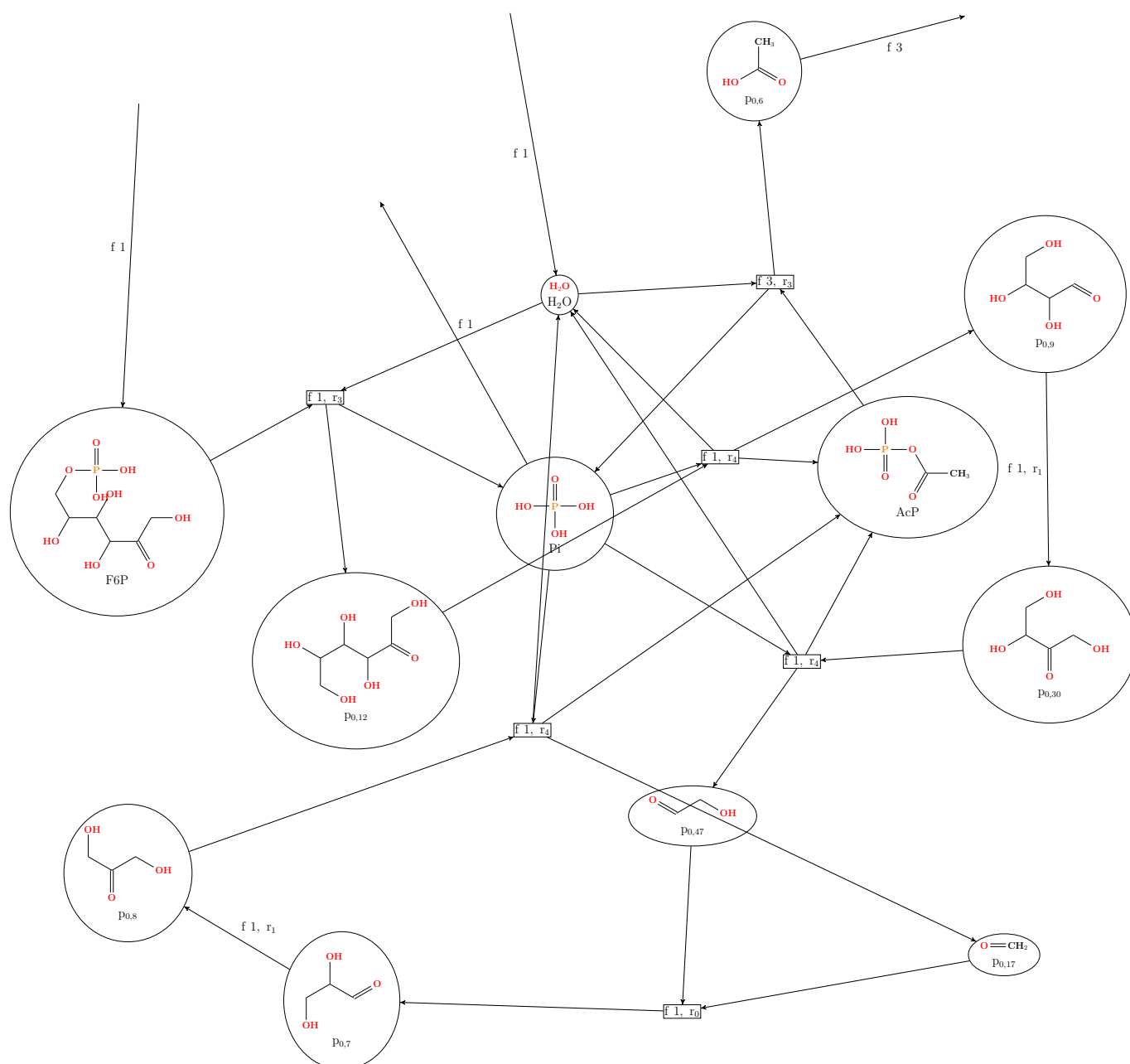
F6P 1 0

H<sub>2</sub>O 1 0

Pi 0 1

p<sub>{0,6}</sub> 0 3

### Filtered Graph



$$|E| = 8 \quad |P| = 10$$

## 0.7.19 Solution 24

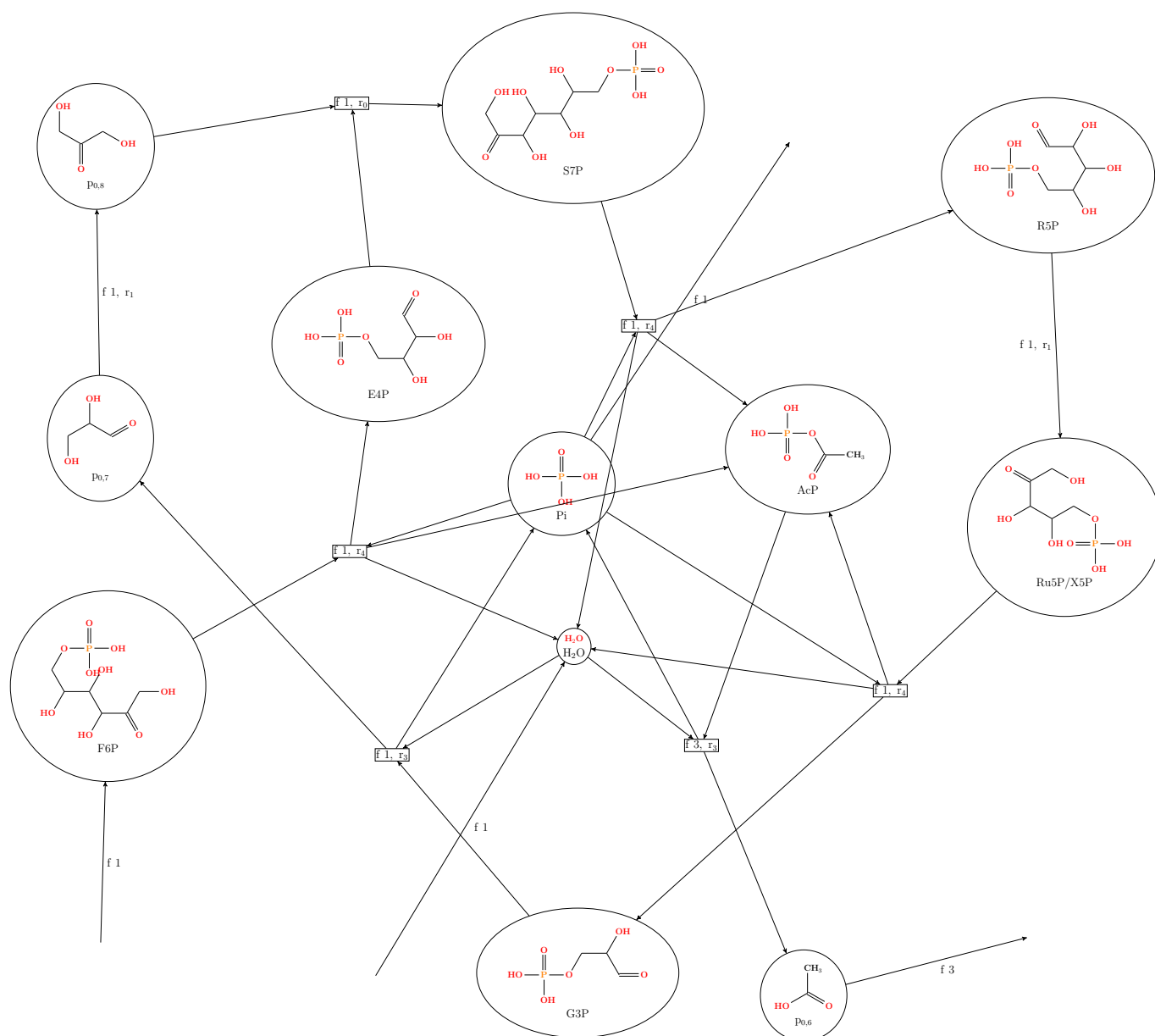
### Overall Data

Objective value (integral): 10

Vertex/Graph In Out

F6P	1	0
H <sub>2</sub> O	1	0
Pi	0	1
p <sub>{0,6}</sub>	0	3

### Filtered Graph



File: out/338\_dg\_0\_11100\_f\_0\_24\_filt

$$|E| = 8 \quad |P| = 10$$

## 0.7.20 Solution 25

### Overall Data

Objective value (integral): 10

Vertex/Graph In Out

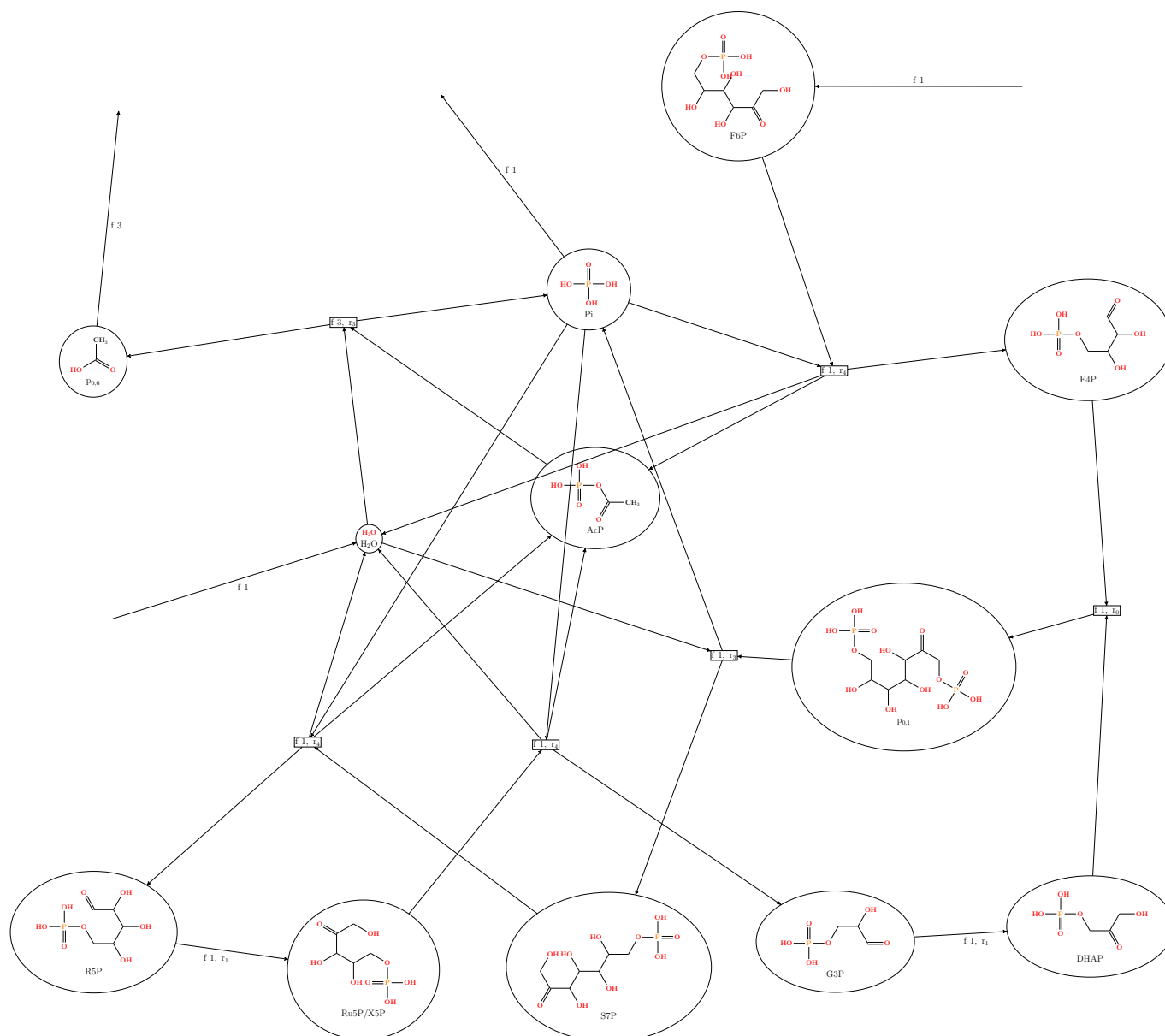
F6P 1 0

H<sub>2</sub>O 1 0

Pi 0 1

p<sub>{0,6}</sub> 0 3

### Filtered Graph



File: out/343\_dg\_0\_11100\_f\_0\_25\_filt

$$|E| = 8 \quad |P| = 10$$



## 0.7.21 Solution 28

### Overall Data

Objective value (integral): 10

Vertex/Graph	In	Out
--------------	----	-----

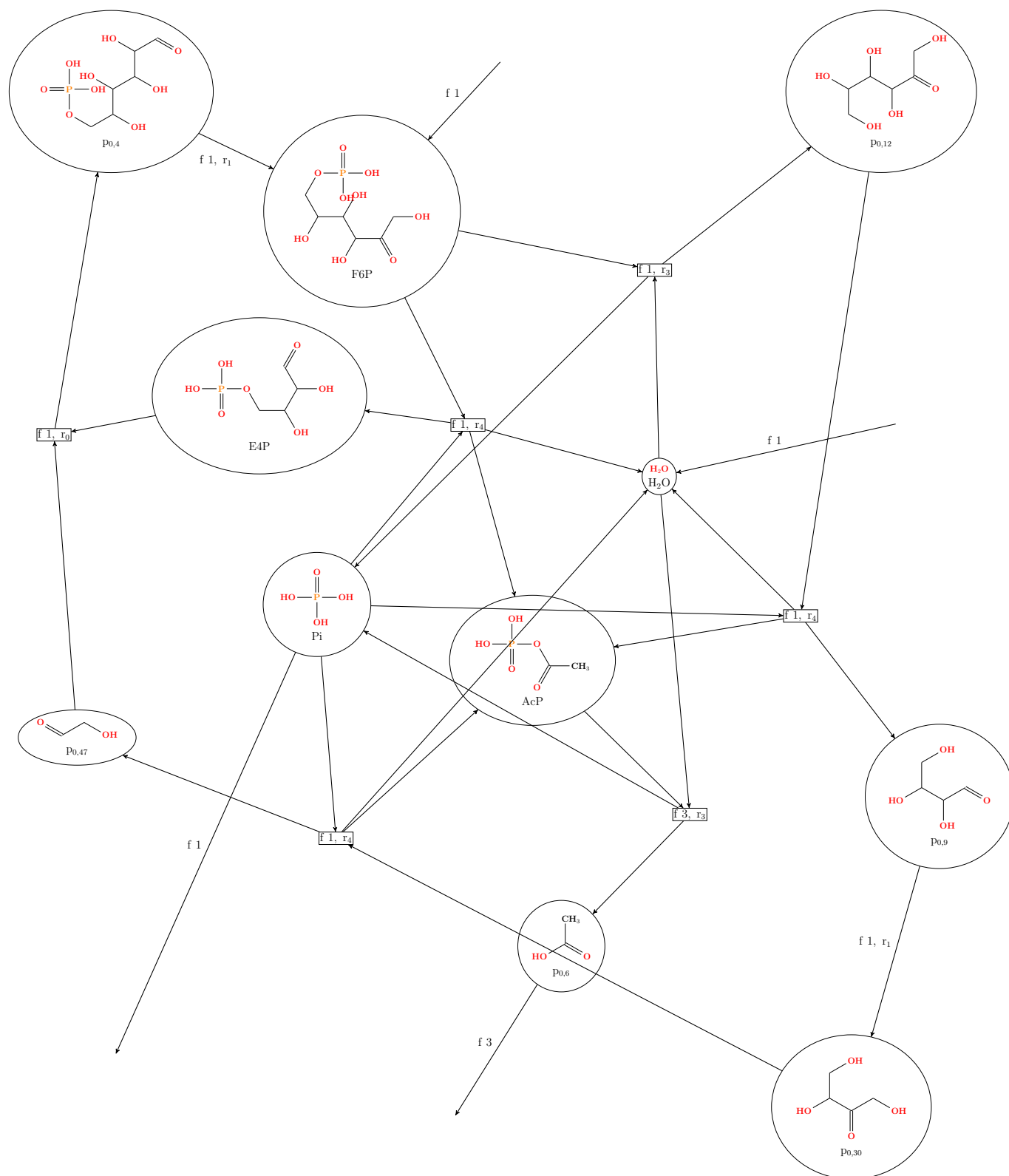
F6P	1	0
-----	---	---

H_20	1	0
------	---	---

Pi	0	1
----	---	---

p_{0,6}	0	3
---------	---	---

## Filtered Graph



File: out/348\_dg\_0\_11100\_f\_0\_28\_filt

$$|E| = 8 \quad |P| = 10$$

## 0.7.22 Solution 29

### Overall Data

Objective value (integral): 10

Vertex/Graph	In	Out
--------------	----	-----

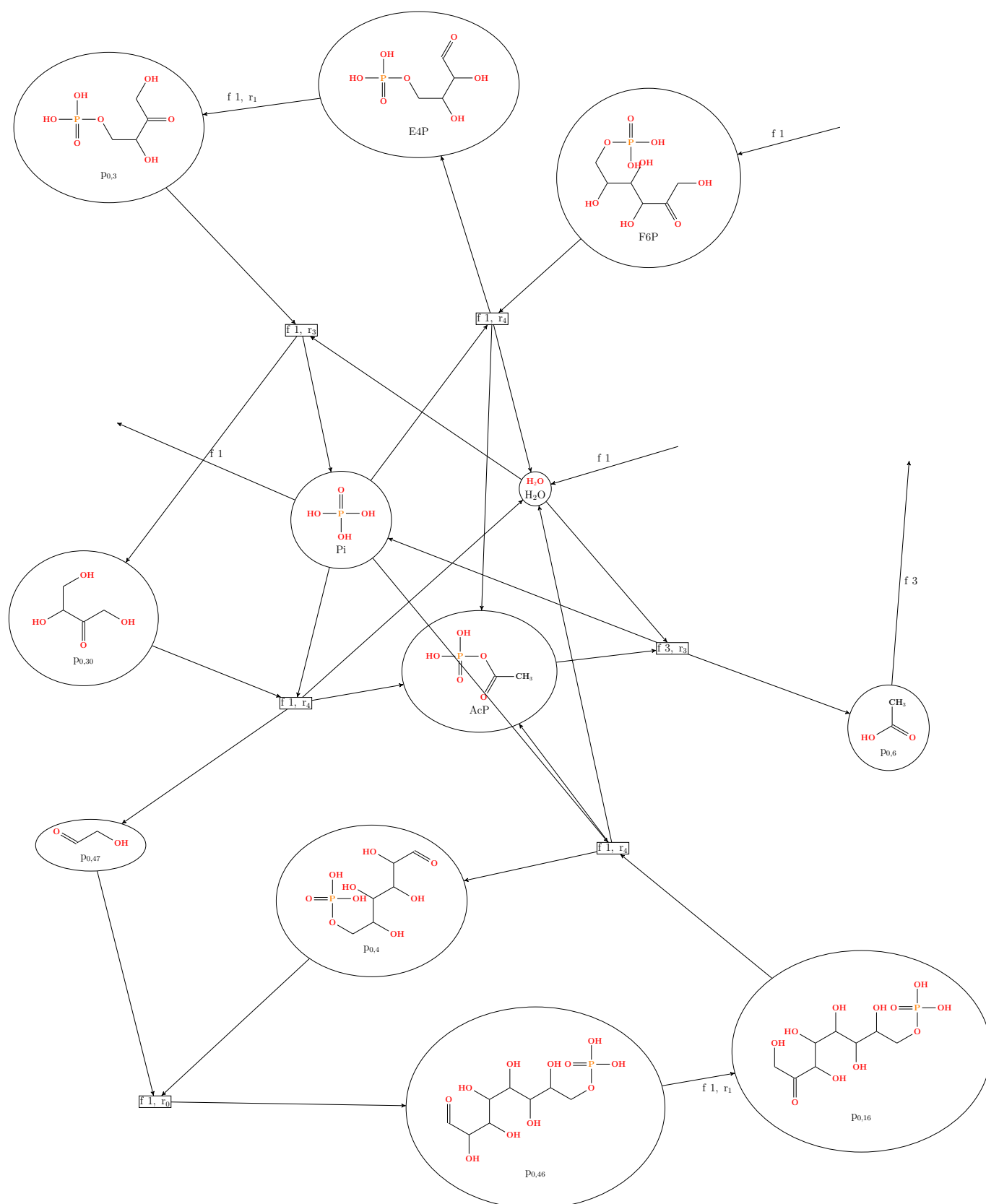
F6P	1	0
-----	---	---

H_20	1	0
------	---	---

Pi	0	1
----	---	---

p_{0,6}	0	3
---------	---	---

## Filtered Graph



File: out/353\_dg\_0\_11100\_f\_0\_29\_filt

$$|E| = 8 \quad |P| = 10$$

### 0.7.23 Solution 30

#### Overall Data

Objective value (integral): 10

Vertex/Graph	In	Out
--------------	----	-----

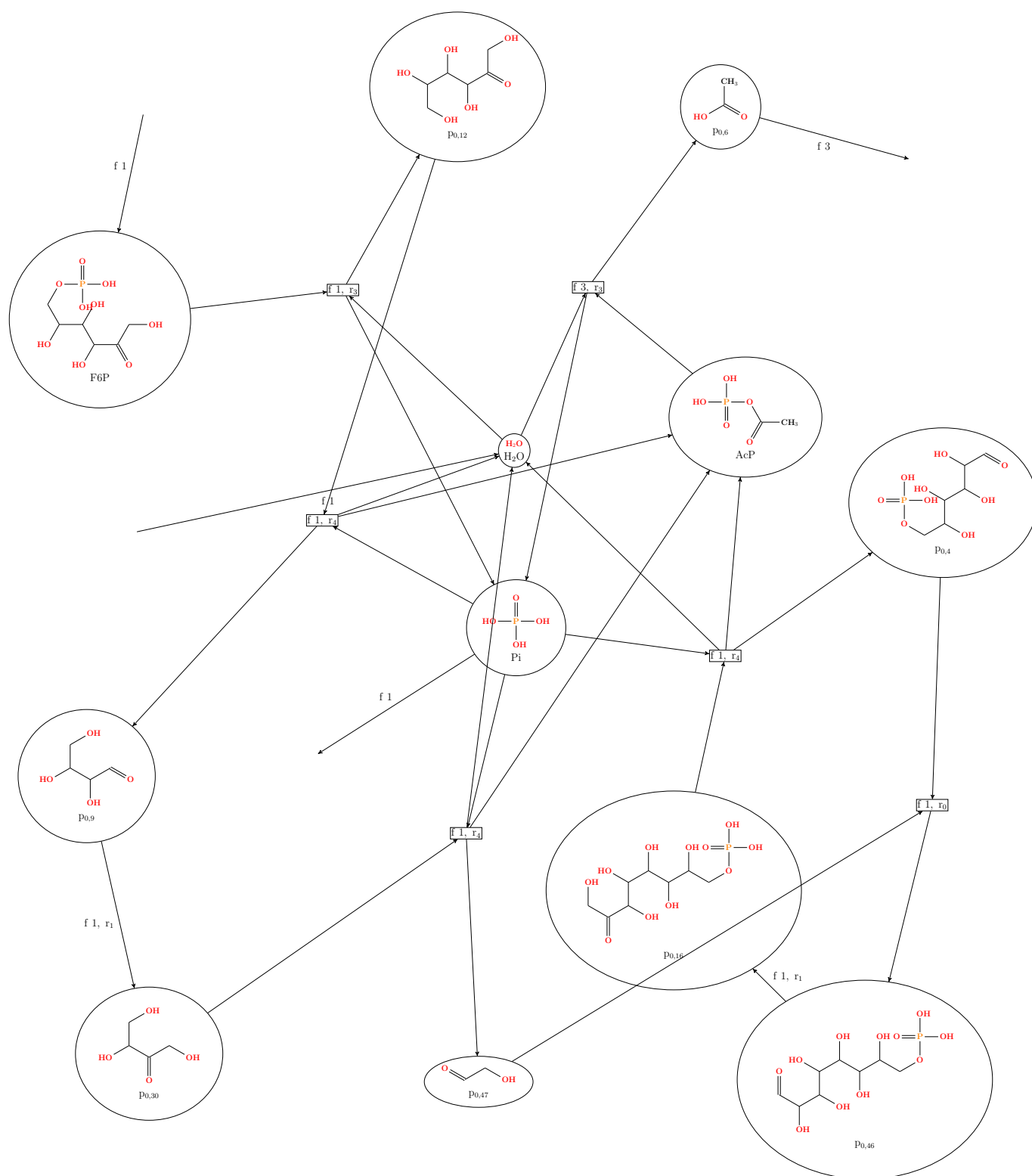
F6P	1	0
-----	---	---

H_20	1	0
------	---	---

Pi	0	1
----	---	---

p_{0,6}	0	3
---------	---	---

## Filtered Graph



File: out/358\_dg\_0\_11100\_f\_0\_30\_filt

$$|\mathbf{E}| = 8 \quad |\mathbf{P}| = 10$$

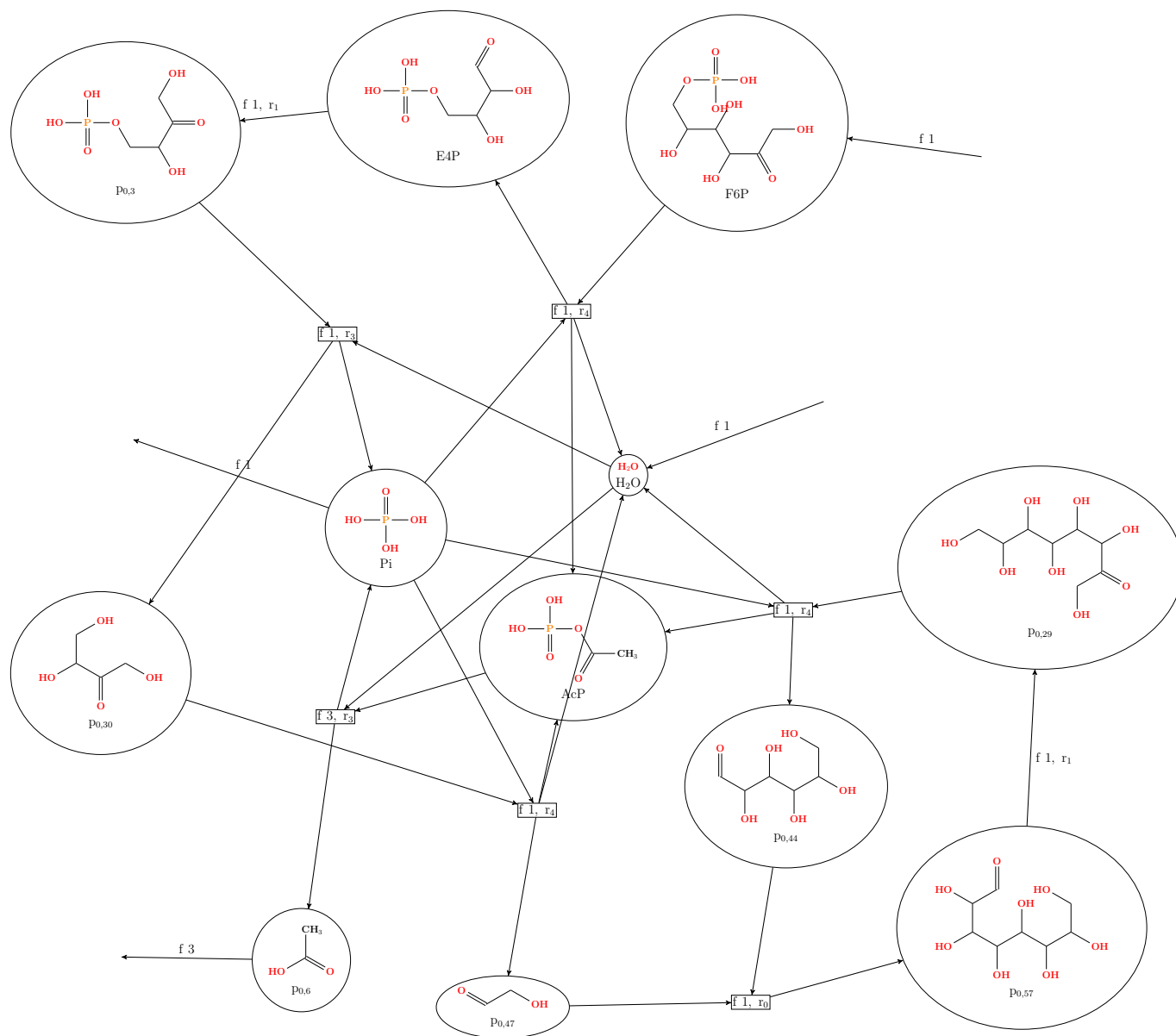
### 0.7.24 Solution 31

## Overall Data

Objective value (integral): 10

Vertex/Graph	In	Out
F6P	1	0
H <sub>2</sub> O	1	0
Pi	0	1
p <sub>{0,6}</sub>	0	3

## Filtered Graph



File: out/363\_dg\_0\_11100\_f\_0\_31\_filt

$$|E| = 8 \quad |P| = 10$$

## 0.7.25 Solution 32

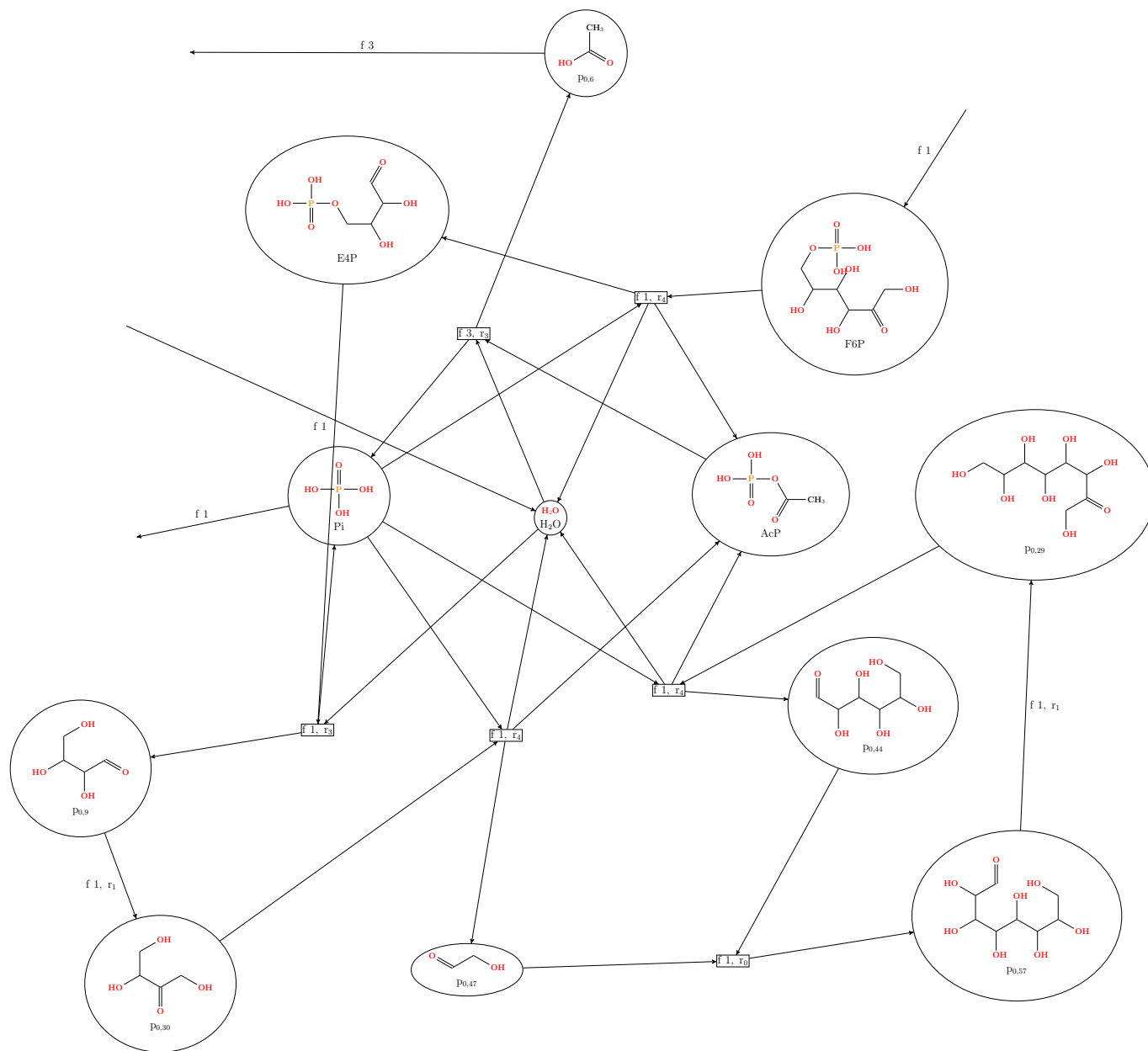
### Overall Data

Objective value (integral): 10

Vertex/Graph	In	Out
F6P	1	0

H_20	1	0
Pi	0	1
p_{0,6}	0	3

## Filtered Graph



File: out/368\_dg\_0\_11100\_f\_0\_32\_filt

$$|E| = 8 \quad |P| = 10$$

### 0.7.26 Solution 33

## Overall Data

Objective value (integral): 10

Vertex/Graph	In	Out
1	0	0
2	0	0
3	0	0
4	0	0
5	0	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0
17	0	0
18	0	0
19	0	0
20	0	0
21	0	0
22	0	0
23	0	0
24	0	0
25	0	0
26	0	0
27	0	0
28	0	0
29	0	0
30	0	0
31	0	0
32	0	0
33	0	0
34	0	0
35	0	0
36	0	0
37	0	0
38	0	0
39	0	0
40	0	0
41	0	0
42	0	0
43	0	0
44	0	0
45	0	0
46	0	0
47	0	0
48	0	0
49	0	0
50	0	0
51	0	0
52	0	0
53	0	0
54	0	0
55	0	0
56	0	0
57	0	0
58	0	0
59	0	0
60	0	0
61	0	0
62	0	0
63	0	0
64	0	0
65	0	0
66	0	0
67	0	0
68	0	0
69	0	0
70	0	0
71	0	0
72	0	0
73	0	0
74	0	0
75	0	0
76	0	0
77	0	0
78	0	0
79	0	0
80	0	0
81	0	0
82	0	0
83	0	0
84	0	0
85	0	0
86	0	0
87	0	0
88	0	0
89	0	0
90	0	0
91	0	0
92	0	0
93	0	0
94	0	0
95	0	0
96	0	0
97	0	0
98	0	0
99	0	0
100	0	0
101	0	0
102	0	0
103	0	0
104	0	0
105	0	0
106	0	0
107	0	0
108	0	0
109	0	0
110	0	0
111	0	0
112	0	0
113	0	0
114	0	0
115	0	0
116	0	0
117	0	0
118	0	0
119	0	0
120	0	0
121	0	0
122	0	0
123	0	0
124	0	0
125	0	0
126	0	0
127	0	0
128	0	0
129	0	0
130	0	0
131	0	0
132	0	0
133	0	0
134	0	0
135	0	0
136	0	0
137	0	0
138	0	0
139	0	

F6P	1	0
-----	---	---

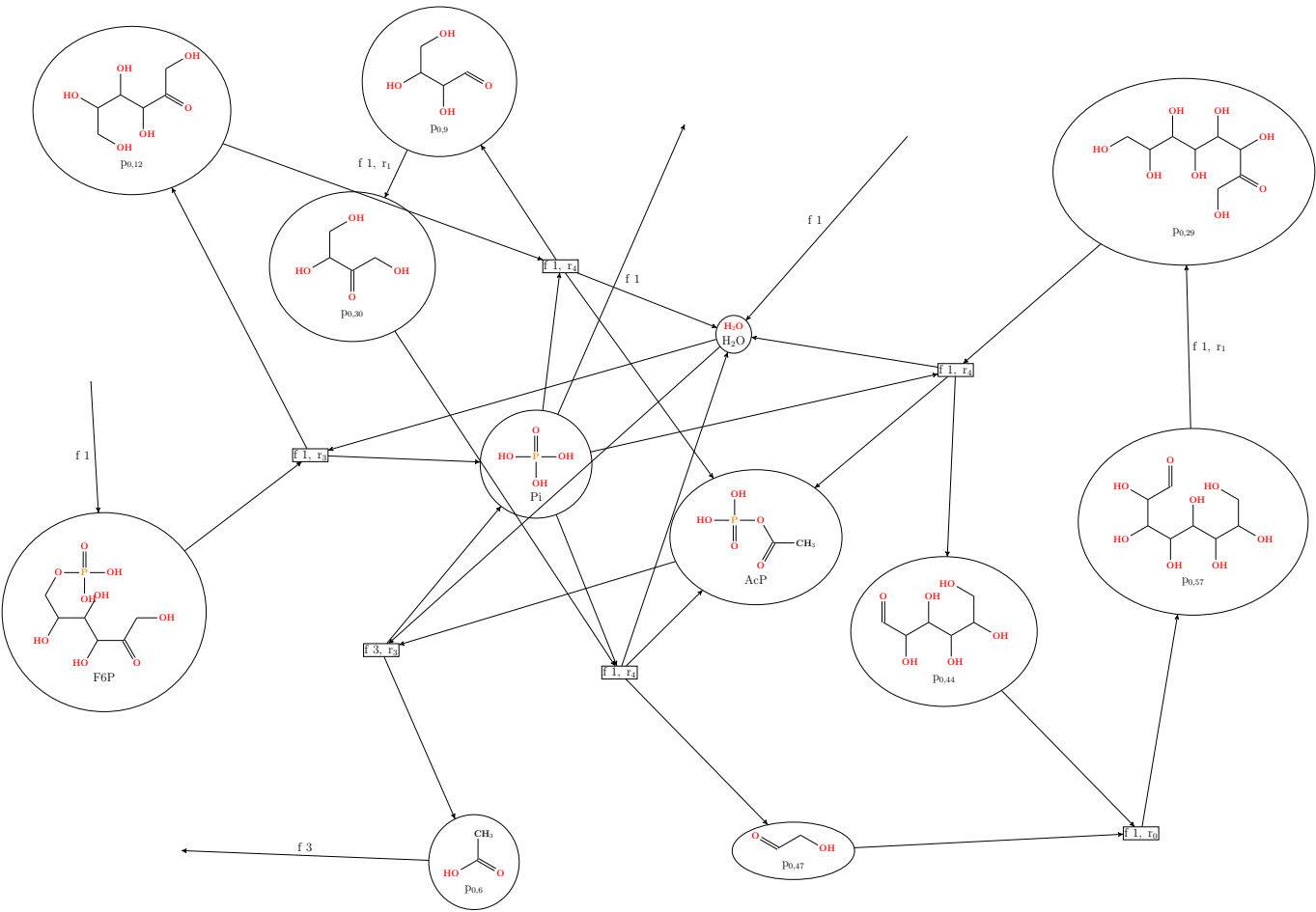
H\_20                    1   0

Pi	0	1
----	---	---



p\_{0,6}      0   3

Filtered Graph



File: out/373\_dg\_0\_11100\_f\_0\_33\_filt

$|E| = 8 \quad |P| = 10$

0.7.27    Solution 34

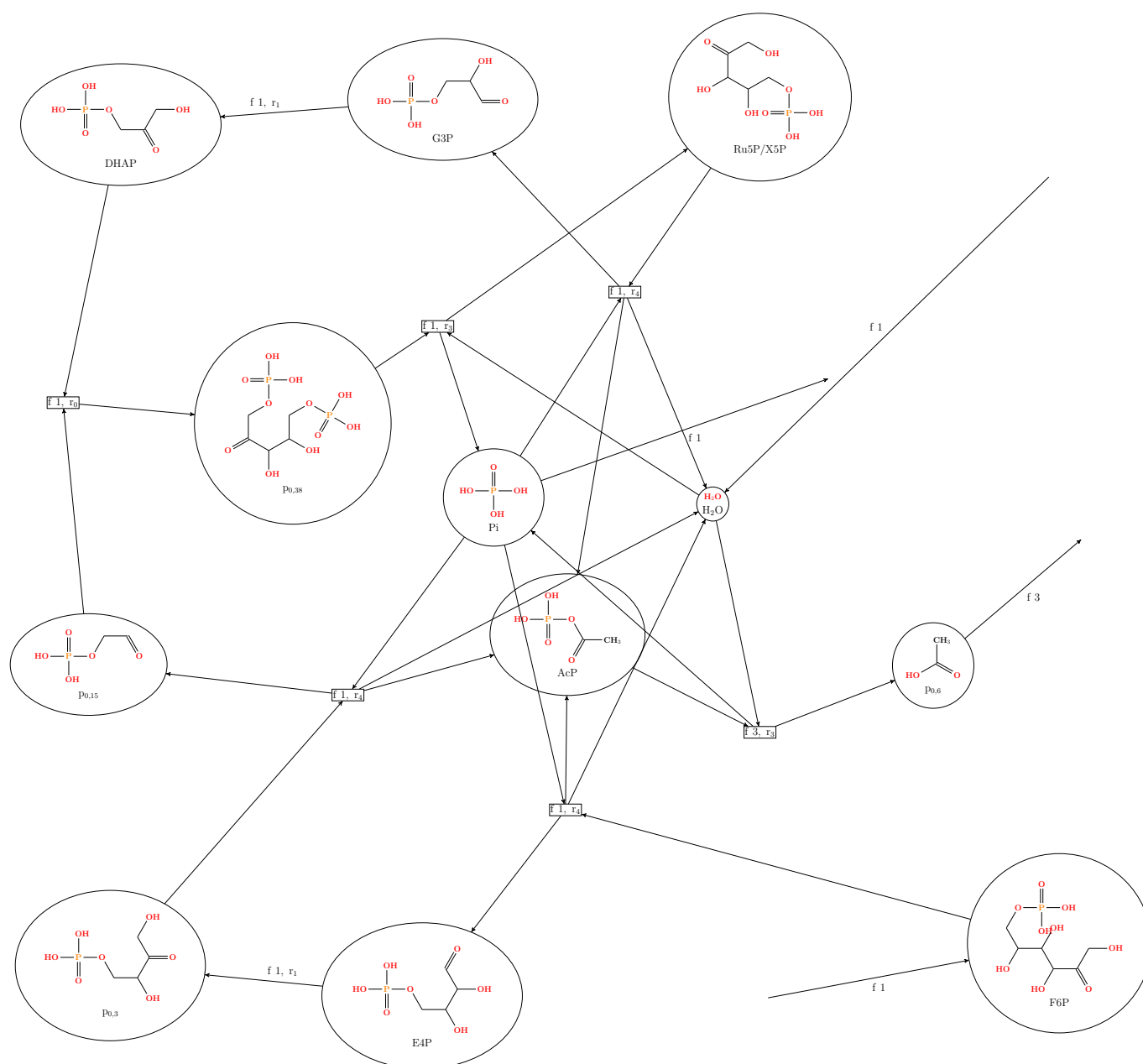
Overall Data

Objective value (integral): 10

Vertex/Graph In Out

F6P	1	0
H_20	1	0
Pi	0	1
p_{0,6}	0	3

## Filtered Graph



File: out/378\_dg\_0\_11100\_f\_0\_34\_filt

$$|\mathbf{E}| = 8 \quad |\mathbf{P}| = 10$$

### 0.7.28 Solution 35

## Overall Data

Objective value (integral): 10

Vertex/Graph	In	Out
1	0	0
2	0	0
3	0	0
4	0	0
5	0	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0
17	0	0
18	0	0
19	0	0
20	0	0
21	0	0
22	0	0
23	0	0
24	0	0
25	0	0
26	0	0
27	0	0
28	0	0
29	0	0
30	0	0
31	0	0
32	0	0
33	0	0
34	0	0
35	0	0
36	0	0
37	0	0
38	0	0
39	0	0
40	0	0
41	0	0
42	0	0
43	0	0
44	0	0
45	0	0
46	0	0
47	0	0
48	0	0
49	0	0
50	0	0
51	0	0
52	0	0
53	0	0
54	0	0
55	0	0
56	0	0
57	0	0
58	0	0
59	0	0
60	0	0
61	0	0
62	0	0
63	0	0
64	0	0
65	0	0
66	0	0
67	0	0
68	0	0
69	0	0
70	0	0
71	0	0
72	0	0
73	0	0
74	0	0
75	0	0
76	0	0
77	0	0
78	0	0
79	0	0
80	0	0
81	0	0
82	0	0
83	0	0
84	0	0
85	0	0
86	0	0
87	0	0
88	0	0
89	0	0
90	0	0
91	0	0
92	0	0
93	0	0
94	0	0
95	0	0
96	0	0
97	0	0
98	0	0
99	0	0
100	0	0
101	0	0
102	0	0
103	0	0
104	0	0
105	0	0
106	0	0
107	0	0
108	0	0
109	0	0
110	0	0
111	0	0
112	0	0
113	0	0
114	0	0
115	0	0
116	0	0
117	0	0
118	0	0
119	0	0
120	0	0
121	0	0
122	0	0
123	0	0
124	0	0
125	0	0
126	0	0
127	0	0
128	0	0
129	0	0
130	0	0
131	0	0
132	0	0
133	0	0
134	0	0
135	0	0
136	0	0
137	0	0
138	0	0
139	0	

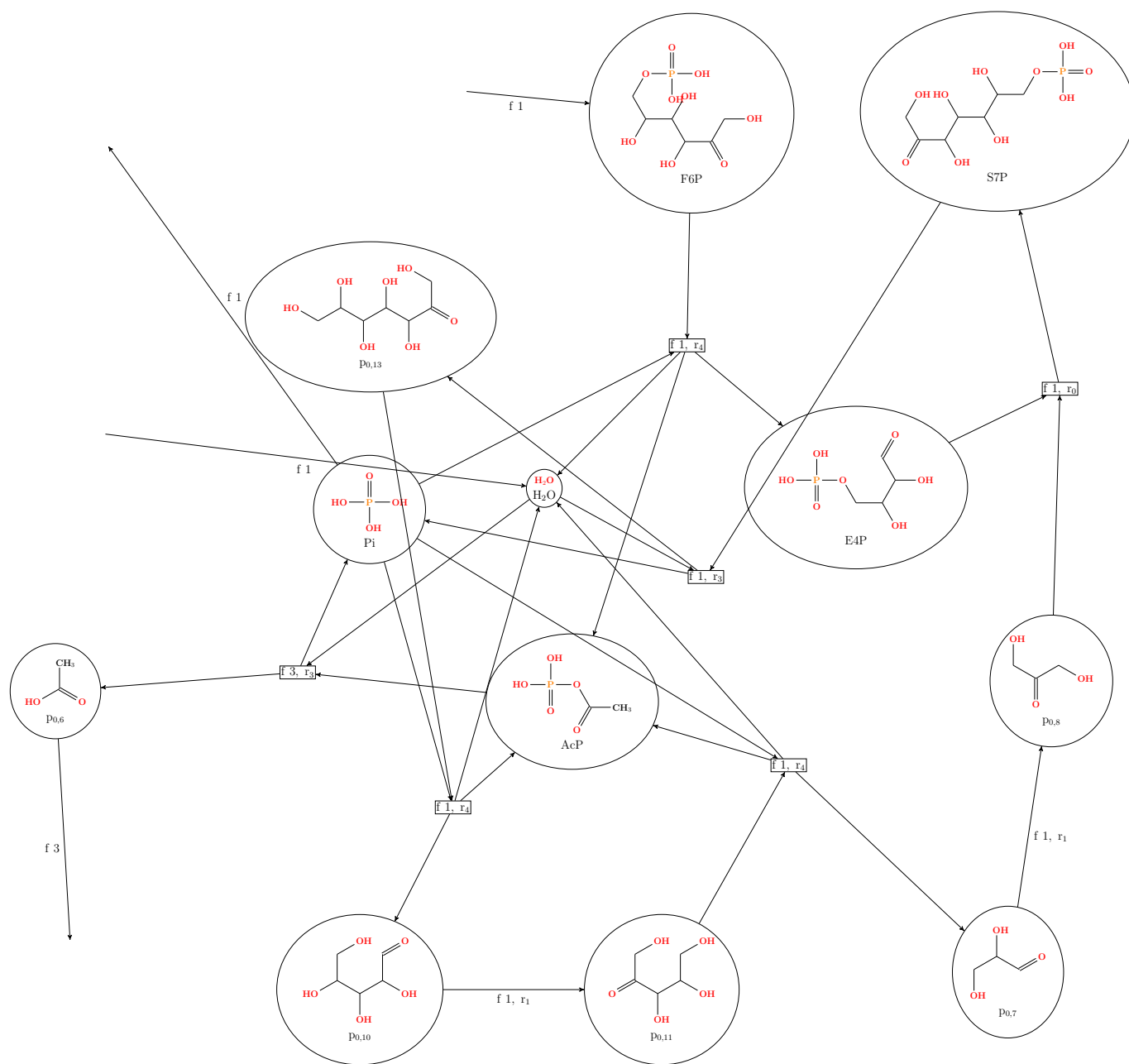
F6P	1	0
-----	---	---

H\_20                    1   0

$\bar{P}_i$	0	1
-------------	---	---

$$p_{\{0,6\}} \quad 0 \quad 3$$

## Filtered Graph



File: out/383\_dg\_0\_11100\_f\_0\_35\_filt

$$|\mathbf{E}| = 8 \quad |\mathbf{P}| = 10$$

### 0.7.29 Solution 36

## Overall Data

Objective value (integral): 10

Vertex/Graph In Out

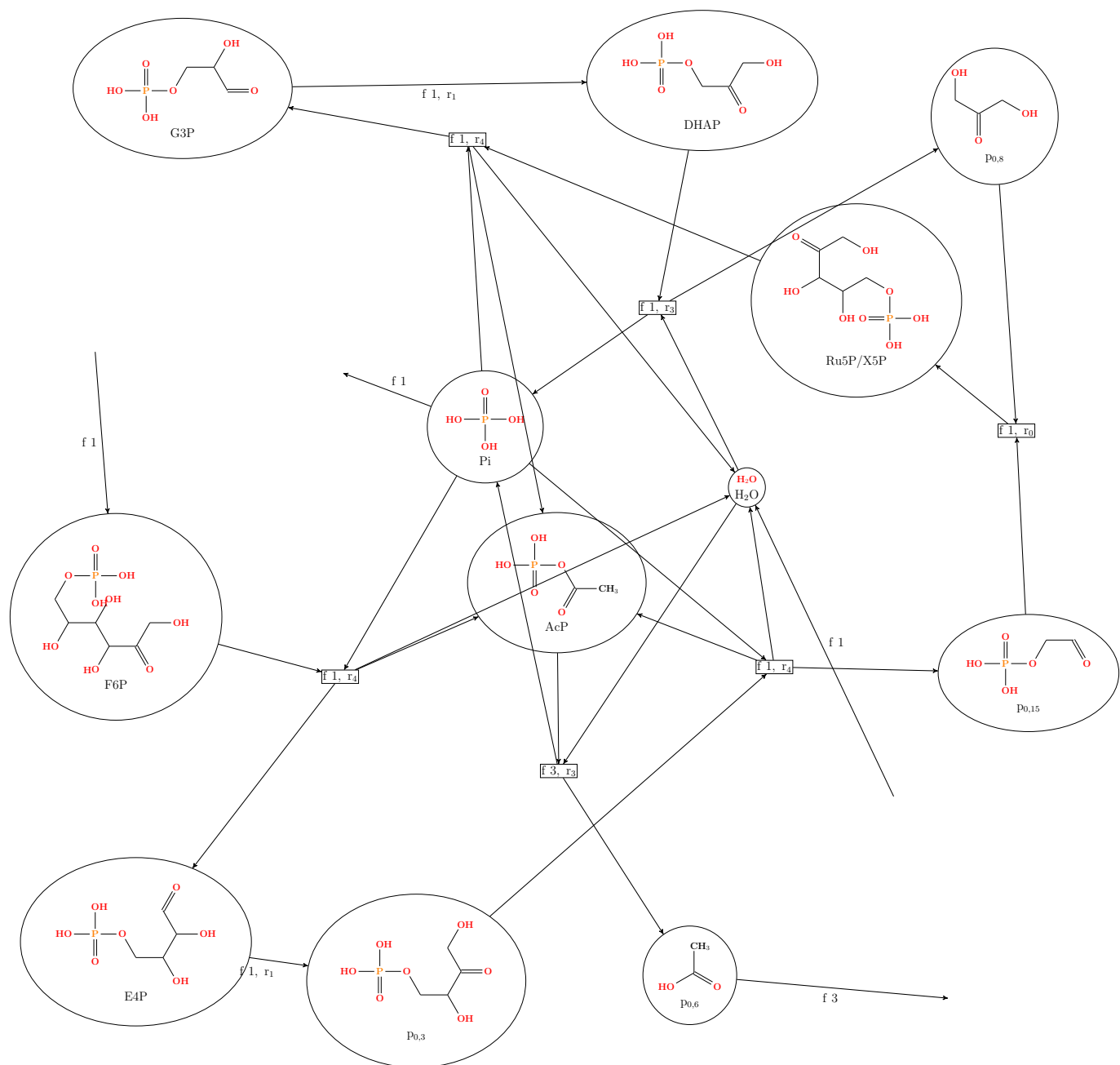
F6P	1	0
-----	---	---

H 20 1 0

Pi	0	1
----	---	---

$$p_{\{0,6\}} \quad 0 \quad 3$$

Filtered Graph



File: out/388\_dg\_0\_11100\_f\_0\_36\_filt

$|E| = 8 \quad |P| = 10$

0.7.30 Solution 37

Overall Data

Objective value (integral): 10

Vertex/Graph In Out

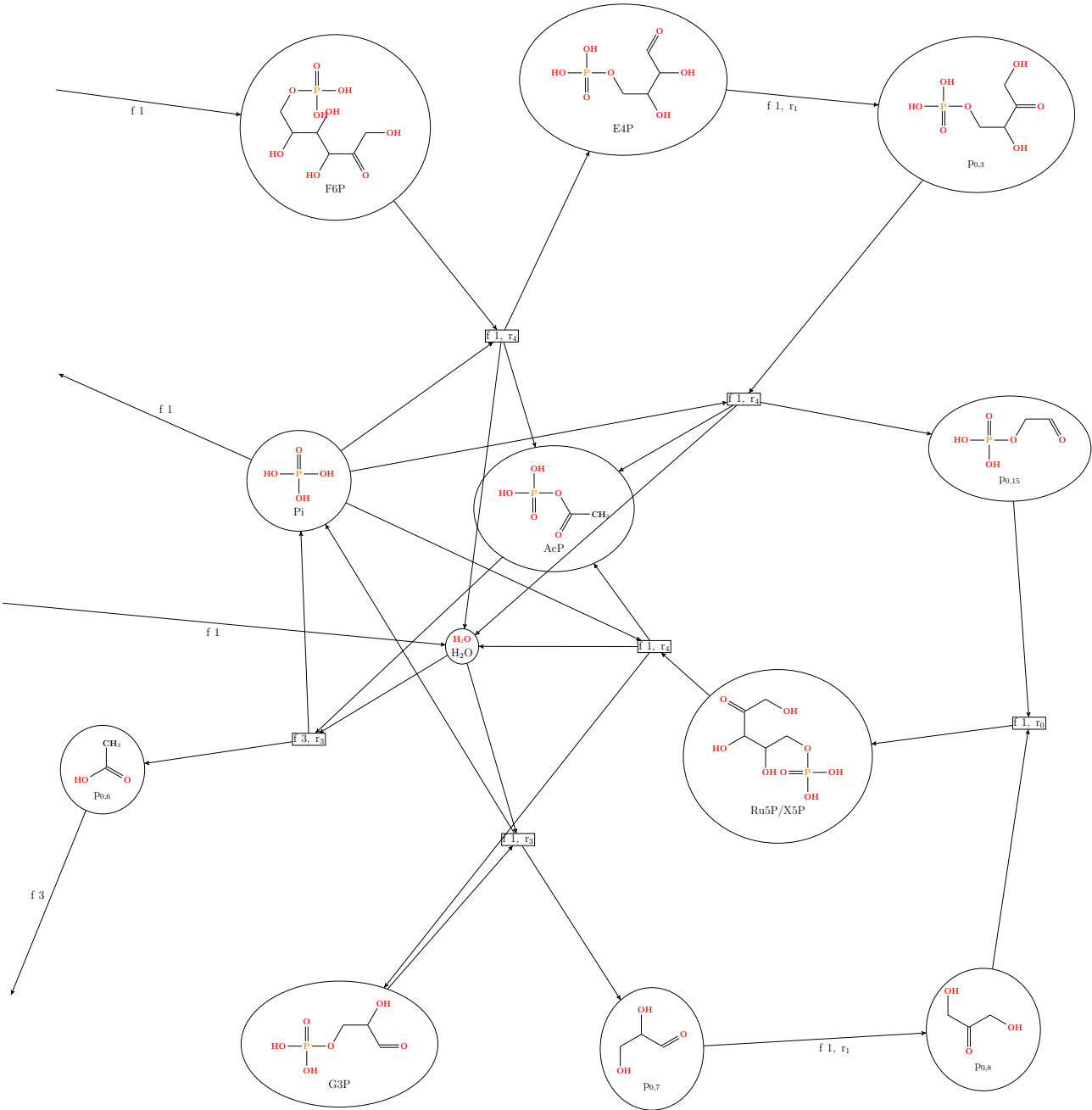
F6P 1 0

H\_2O 1 0

Pi 0 1

p\_{0,6} 0 3

Filtered Graph



File: out/393\_dg\_0\_11100\_f\_0\_37\_filt

$|E| = 8 \quad |P| = 10$

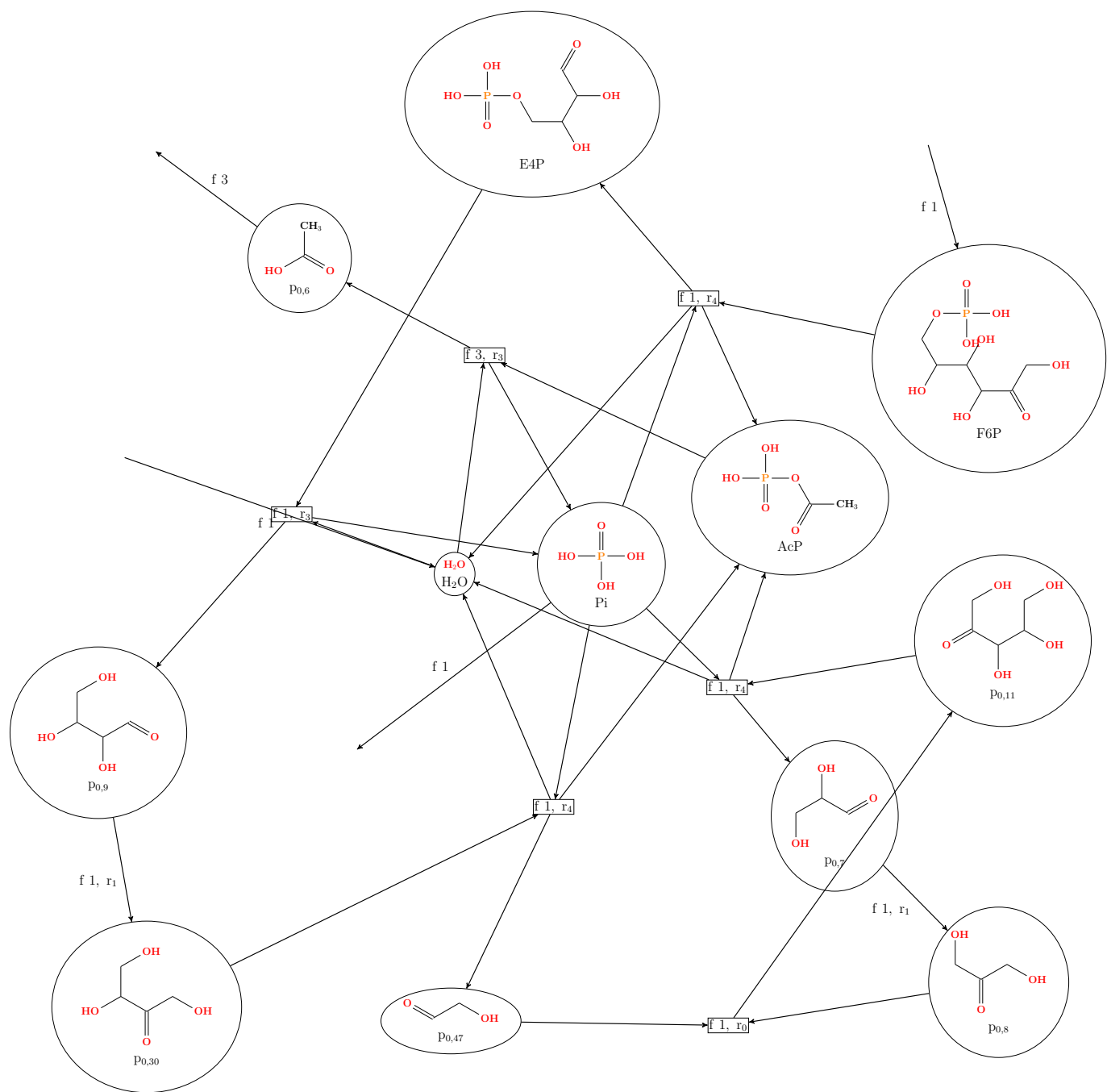
0.7.31 Solution 38

Overall Data

Objective value (integral): 10

Vertex/Graph	In	Out
F6P	1	0
H_20	1	0
Pi	0	1
p_{0,6}	0	3

Filtered Graph



File: out/398\_dg\_0\_11100\_f\_0\_38\_filt

$|E| = 8 \quad |P| = 10$

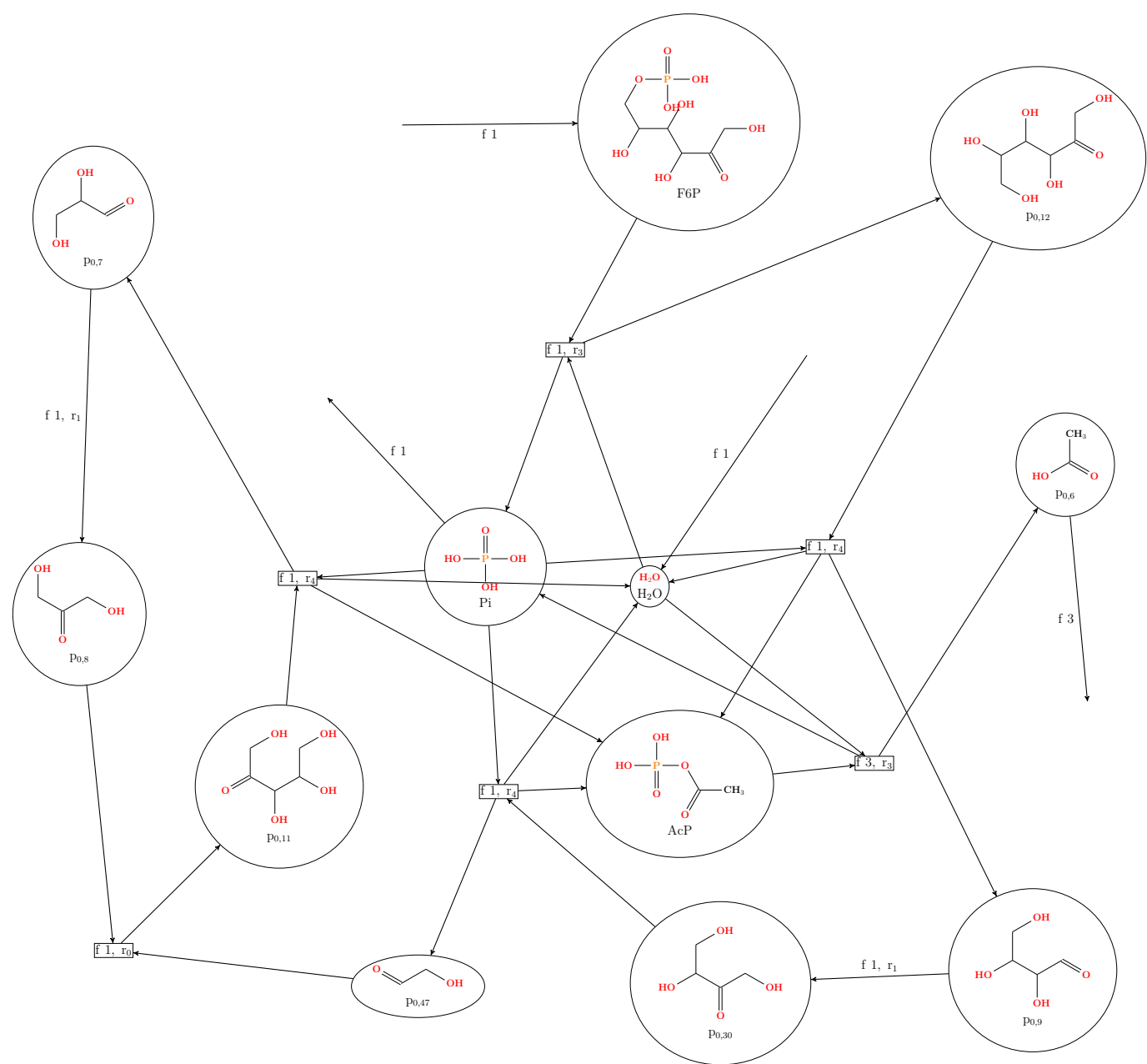
0.7.32 Solution 39

Overall Data

Objective value (integral): 10

Vertex/Graph	In	Out
F6P	1	0
H <sub>2</sub> O	1	0
Pi	0	1
p <sub>{0,6}</sub>	0	3

Filtered Graph



File: out/403\_dg\_0\_11100\_f\_0\_39\_filt

$|E| = 8 \quad |P| = 10$

0.7.33 Solution 40

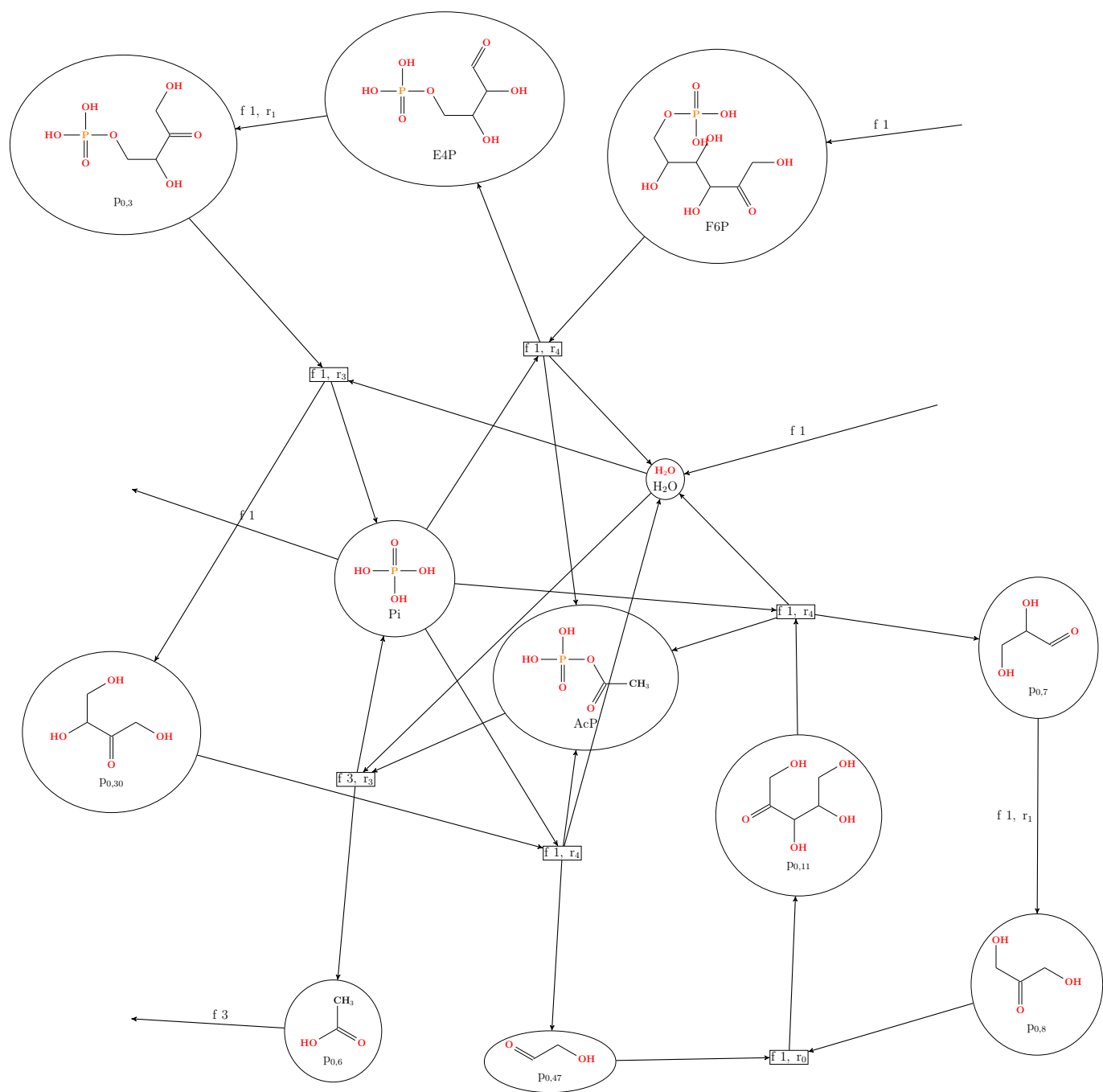
Overall Data

Objective value (integral): 10

Vertex/Graph In Out

F6P	1	0
H_2O	1	0
Pi	0	1
p_{0,6}	0	3

Filtered Graph



File: out/408\_dg\_0\_11100\_f\_0\_40\_filt

$|E| = 8 \quad |P| = 10$

0.7.34 Solution 41

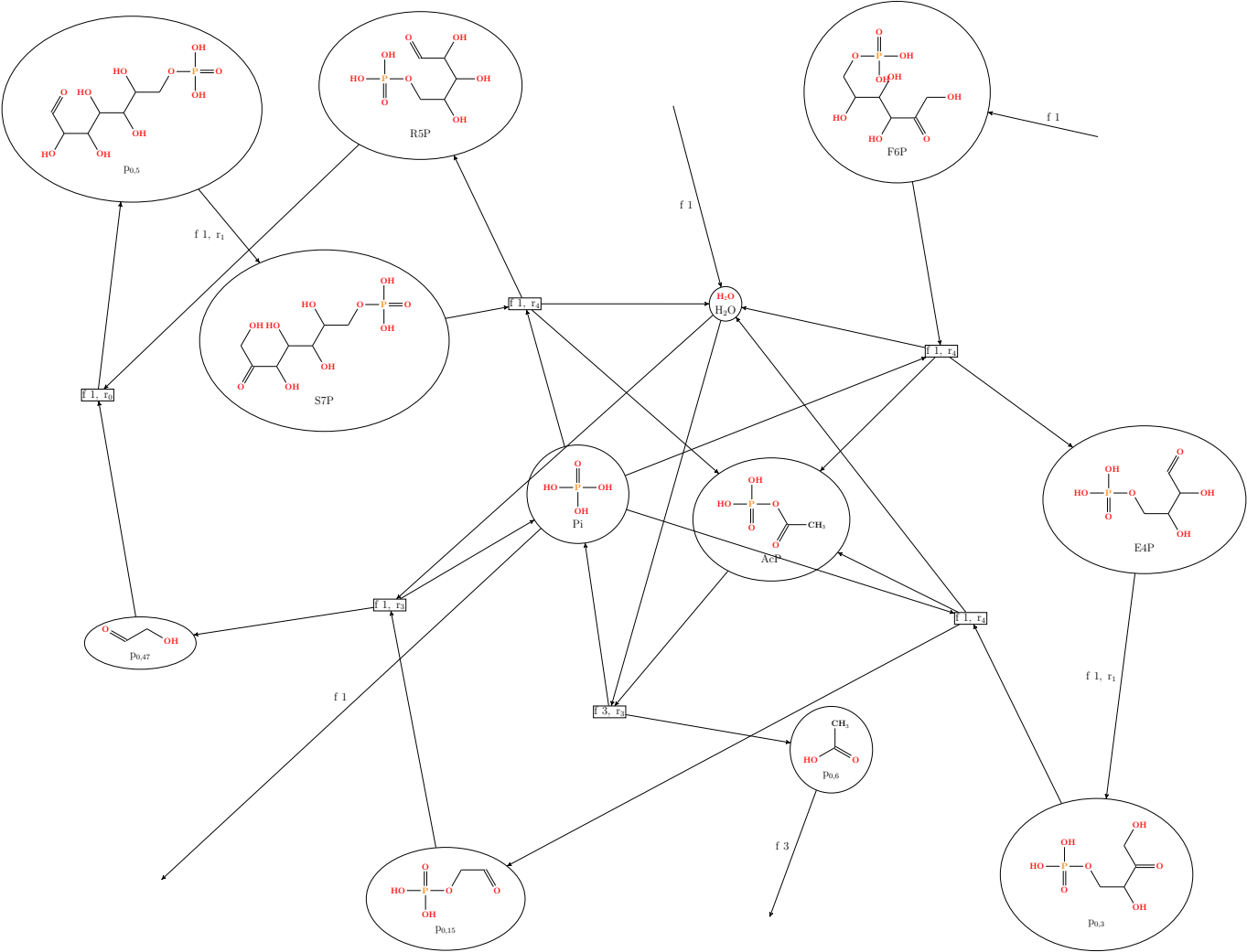
Overall Data

Objective value (integral): 10

Vertex/Graph	In	Out
F6P	1	0
H <sub>2</sub> O	1	0
Pi	0	1
p_{0,6}	0	3



Filtered Graph



File: out/413\_dg\_0\_11100\_f\_0\_41\_filt

$|E| = 8 \quad |P| = 10$

0.7.35    Solution 42

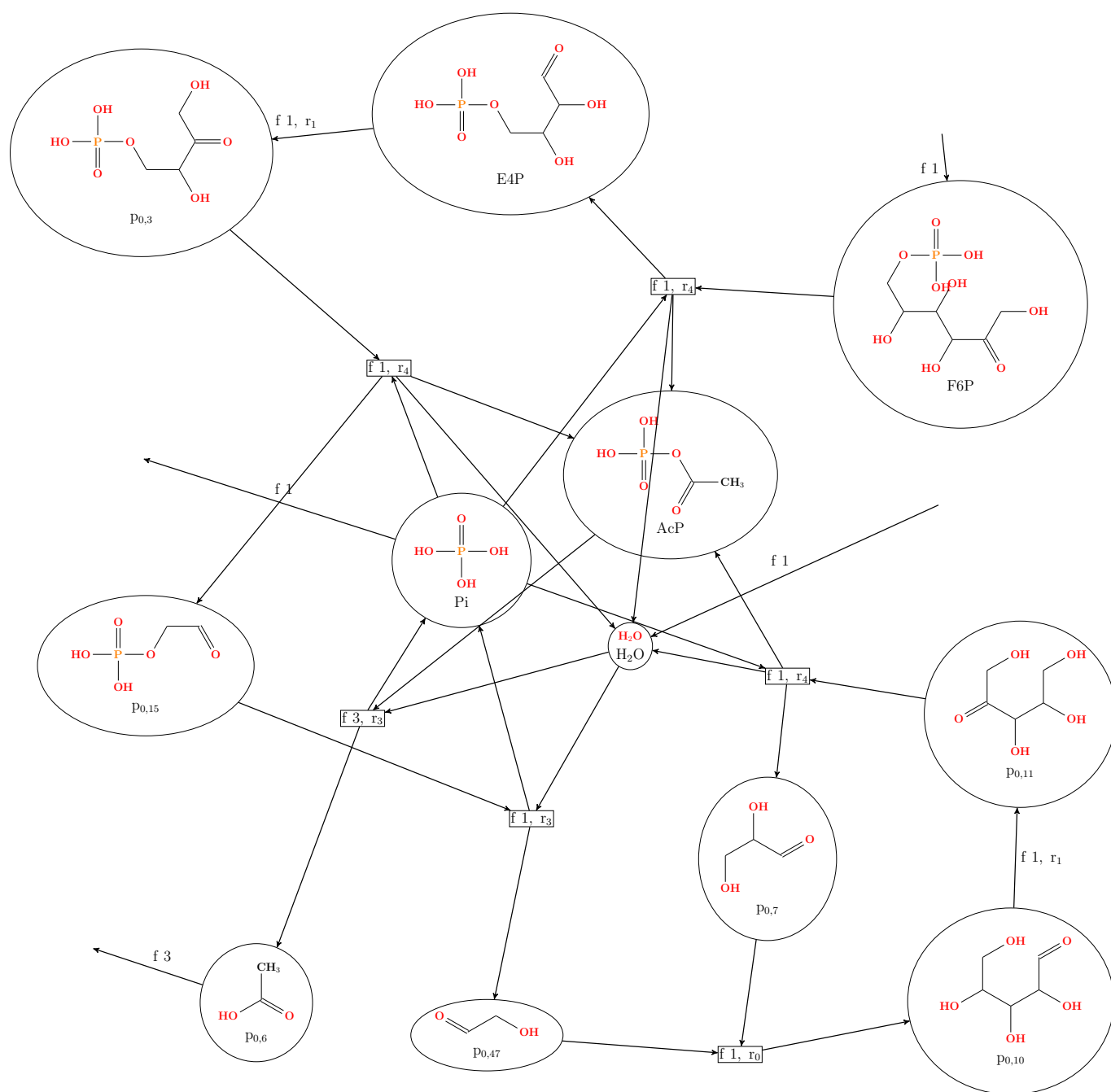
Overall Data

Objective value (integral): 10

Vertex/Graph    In    Out

F6P	1	0
H_20	1	0
Pi	0	1
p_{0,6}	0	3

## Filtered Graph



File: out/418\_dg\_0\_11100\_f\_0\_42\_filt

$$|\mathbf{E}| = 8 \quad |\mathbf{P}| = 10$$

### 0.7.36 Solution 43

## Overall Data

Objective value (integral): 10

Vertex/Graph	In	Out
1	0	0
2	0	0
3	0	0
4	0	0
5	0	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0
17	0	0
18	0	0
19	0	0
20	0	0
21	0	0
22	0	0
23	0	0
24	0	0
25	0	0
26	0	0
27	0	0
28	0	0
29	0	0
30	0	0
31	0	0
32	0	0
33	0	0
34	0	0
35	0	0
36	0	0
37	0	0
38	0	0
39	0	0
40	0	0
41	0	0
42	0	0
43	0	0
44	0	0
45	0	0
46	0	0
47	0	0
48	0	0
49	0	0
50	0	0
51	0	0
52	0	0
53	0	0
54	0	0
55	0	0
56	0	0
57	0	0
58	0	0
59	0	0
60	0	0
61	0	0
62	0	0
63	0	0
64	0	0
65	0	0
66	0	0
67	0	0
68	0	0
69	0	0
70	0	0
71	0	0
72	0	0
73	0	0
74	0	0
75	0	0
76	0	0
77	0	0
78	0	0
79	0	0
80	0	0
81	0	0
82	0	0
83	0	0
84	0	0
85	0	0
86	0	0
87	0	0
88	0	0
89	0	0
90	0	0
91	0	0
92	0	0
93	0	0
94	0	0
95	0	0
96	0	0
97	0	0
98	0	0
99	0	0
100	0	0
101	0	0
102	0	0
103	0	0
104	0	0
105	0	0
106	0	0
107	0	0
108	0	0
109	0	0
110	0	0
111	0	0
112	0	0
113	0	0
114	0	0
115	0	0
116	0	0
117	0	0
118	0	0
119	0	0
120	0	0
121	0	0
122	0	0
123	0	0
124	0	0
125	0	0
126	0	0
127	0	0
128	0	0
129	0	0
130	0	0
131	0	0
132	0	0
133	0	0
134	0	0
135	0	0
136	0	0
137	0	0
138	0	0
139	0	

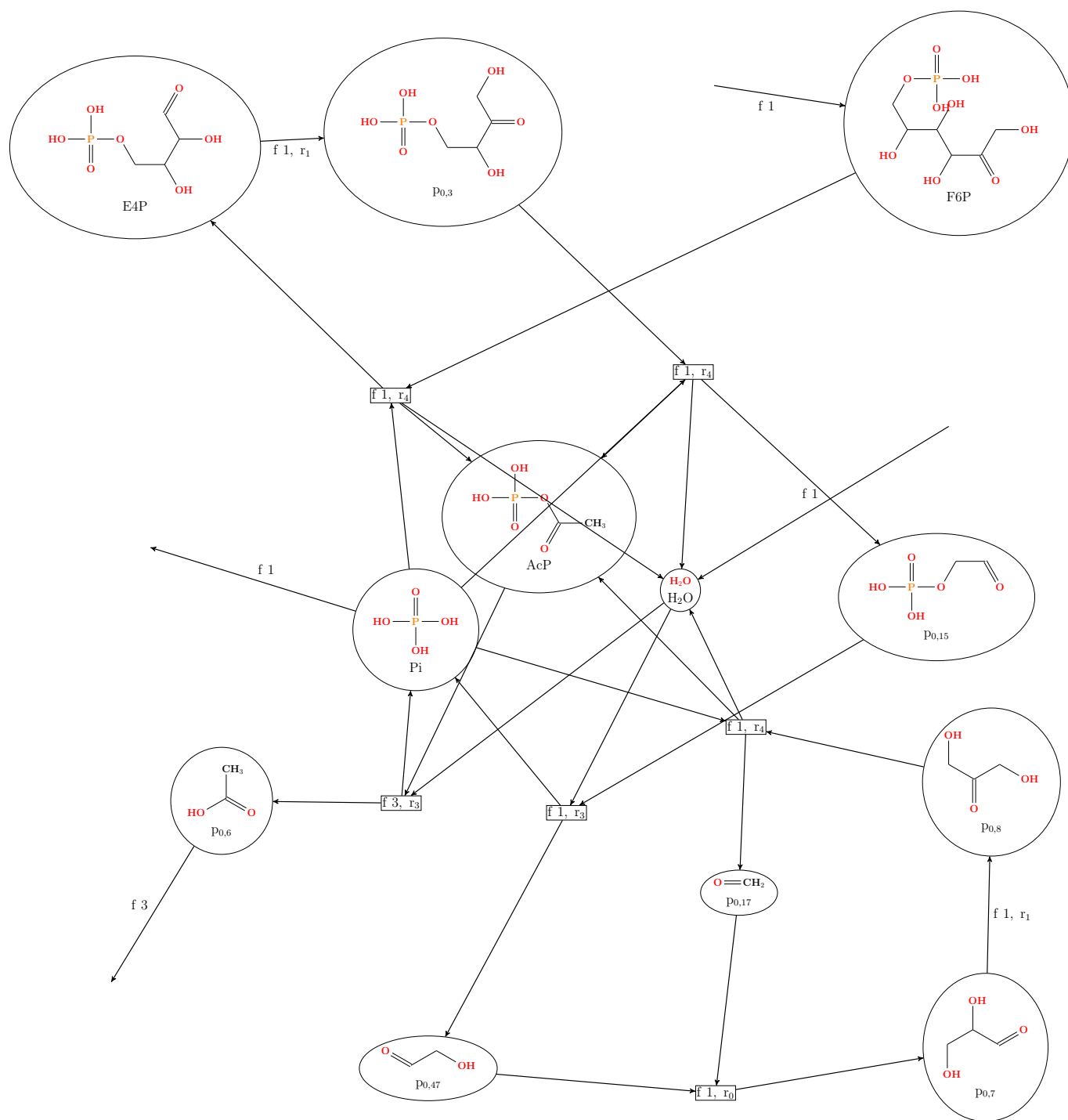
F6P	1	0
-----	---	---

H\_20                      1   0

Pi	0	1
----	---	---

$$p_{\{0,6\}} \quad 0 \quad 3$$

## Filtered Graph



File: out/423\_dg\_0\_11100\_f\_0\_43\_filt

$|E| = 8$   $|P| = 10$

### 0.7.37 Solution 45

#### Overall Data

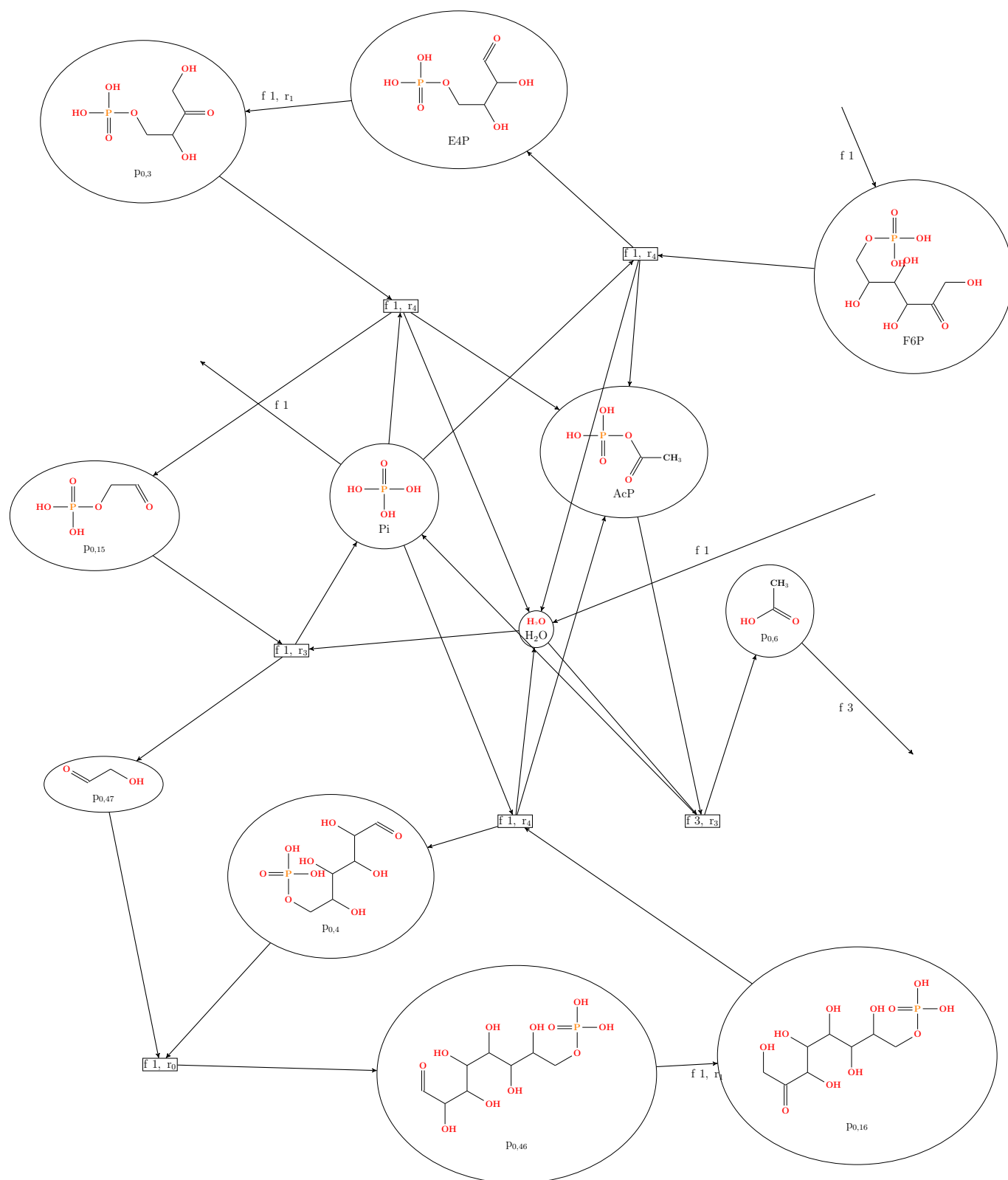
Objective value (integral): 10

Vertex/Graph In Out

F6P	1	0
H <sub>2</sub> O	1	0

Pi            0   1  
p\_{0,6}        0   3

## Filtered Graph



## 0.7.38 Solution 46

### Overall Data

Objective value (integral): 10

Vertex/Graph	In	Out
--------------	----	-----

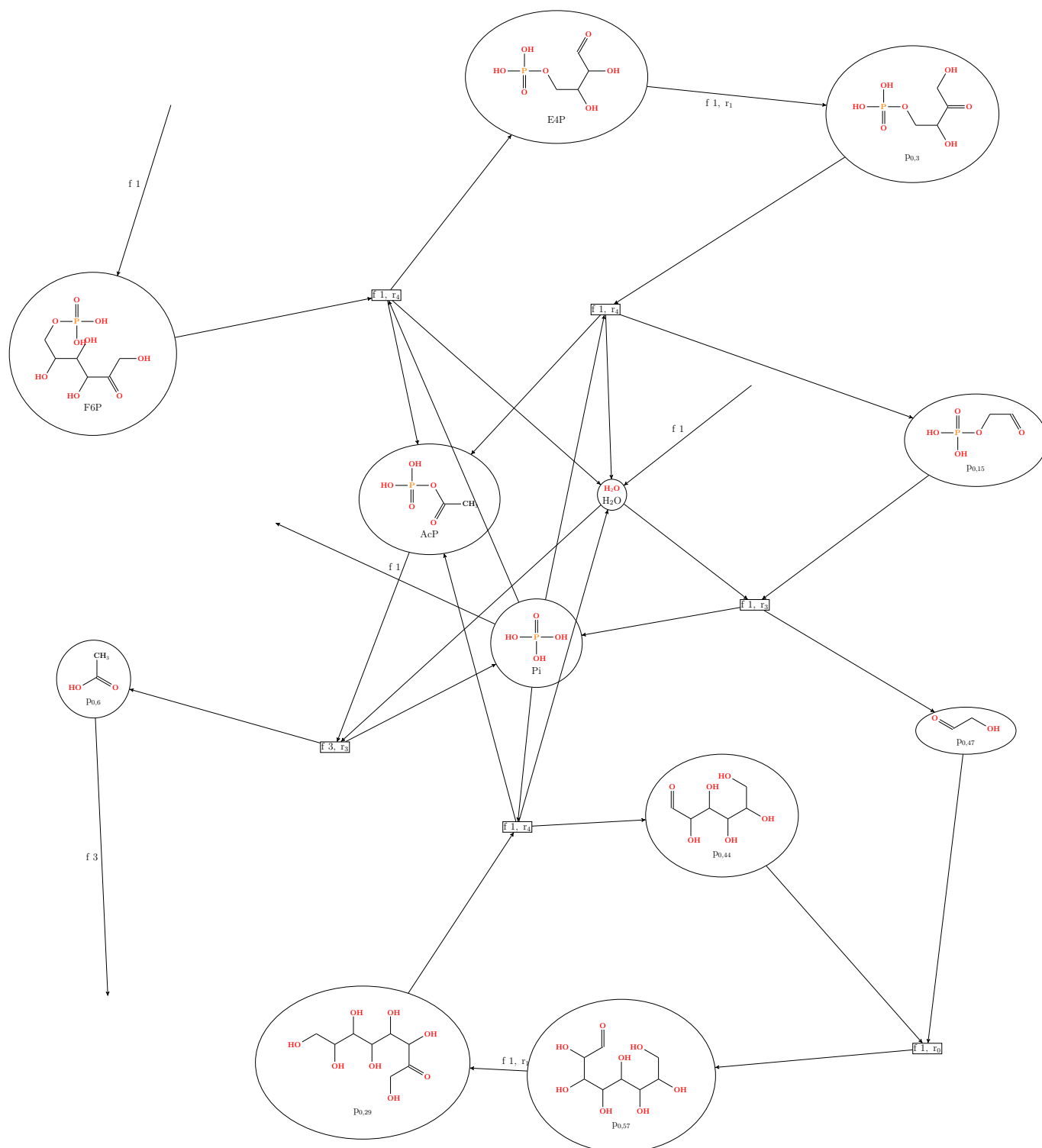
F6P	1	0
-----	---	---

H_20	1	0
------	---	---

Pi	0	1
----	---	---

p_{0,6}	0	3
---------	---	---

## Filtered Graph



File: out/433\_dg\_0\_11100\_f\_0\_46\_filt

$$|\mathbf{E}| = 8 \quad |\mathbf{P}| = 10$$

### 0.7.39 Solution 47

## Overall Data

Objective value (integral): 10



## 0.7.40 Solution 48

### Overall Data

Objective value (integral): 10

Vertex/Graph In Out

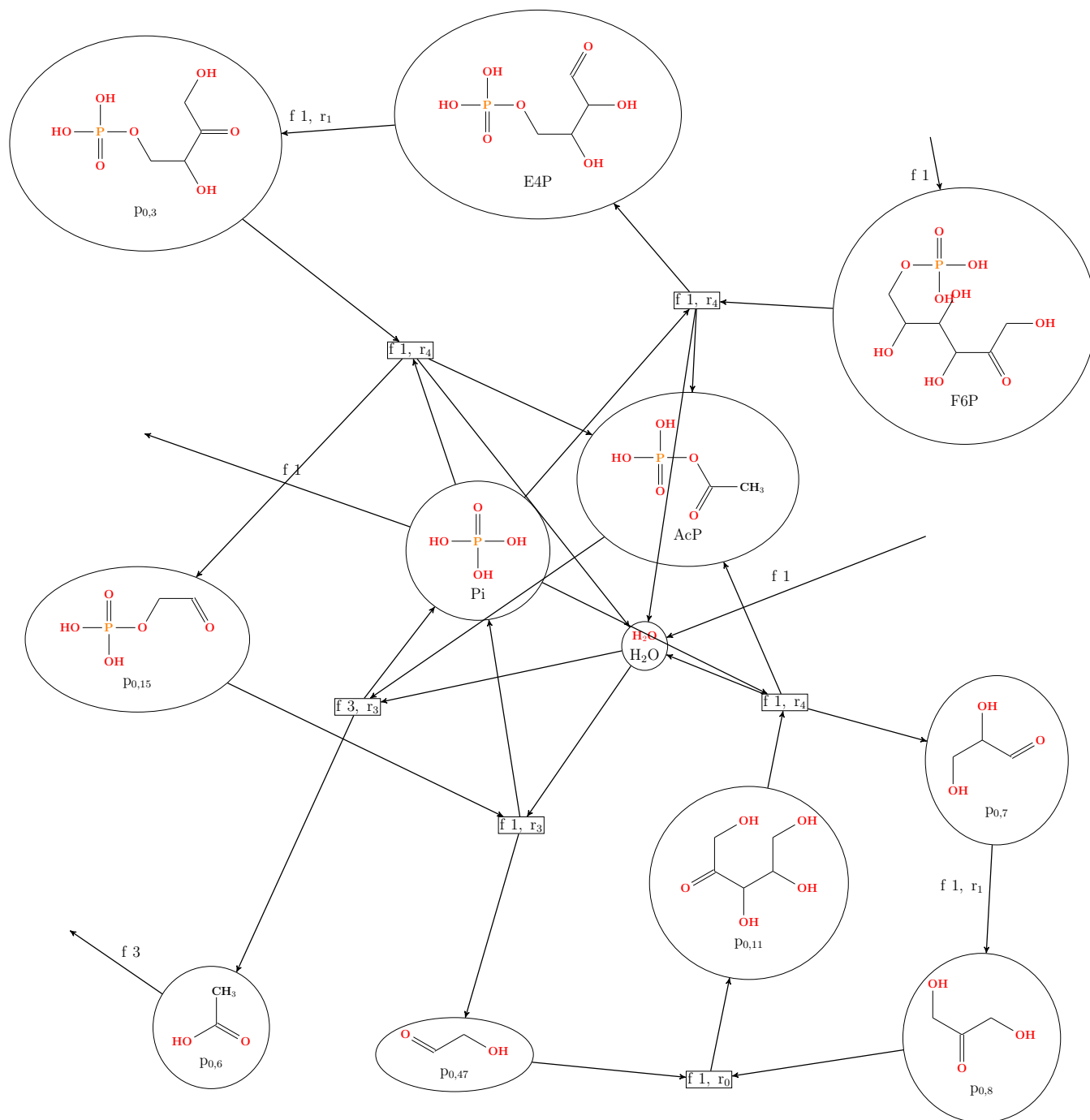
F6P 1 0

H<sub>2</sub>O 1 0

Pi 0 1

p<sub>{0,6}</sub> 0 3

### Filtered Graph



File: out/443\_dg\_0\_11100\_f\_0\_48\_filt



$$|E| = 8 \quad |P| = 10$$

### 0.7.41 Solution 49

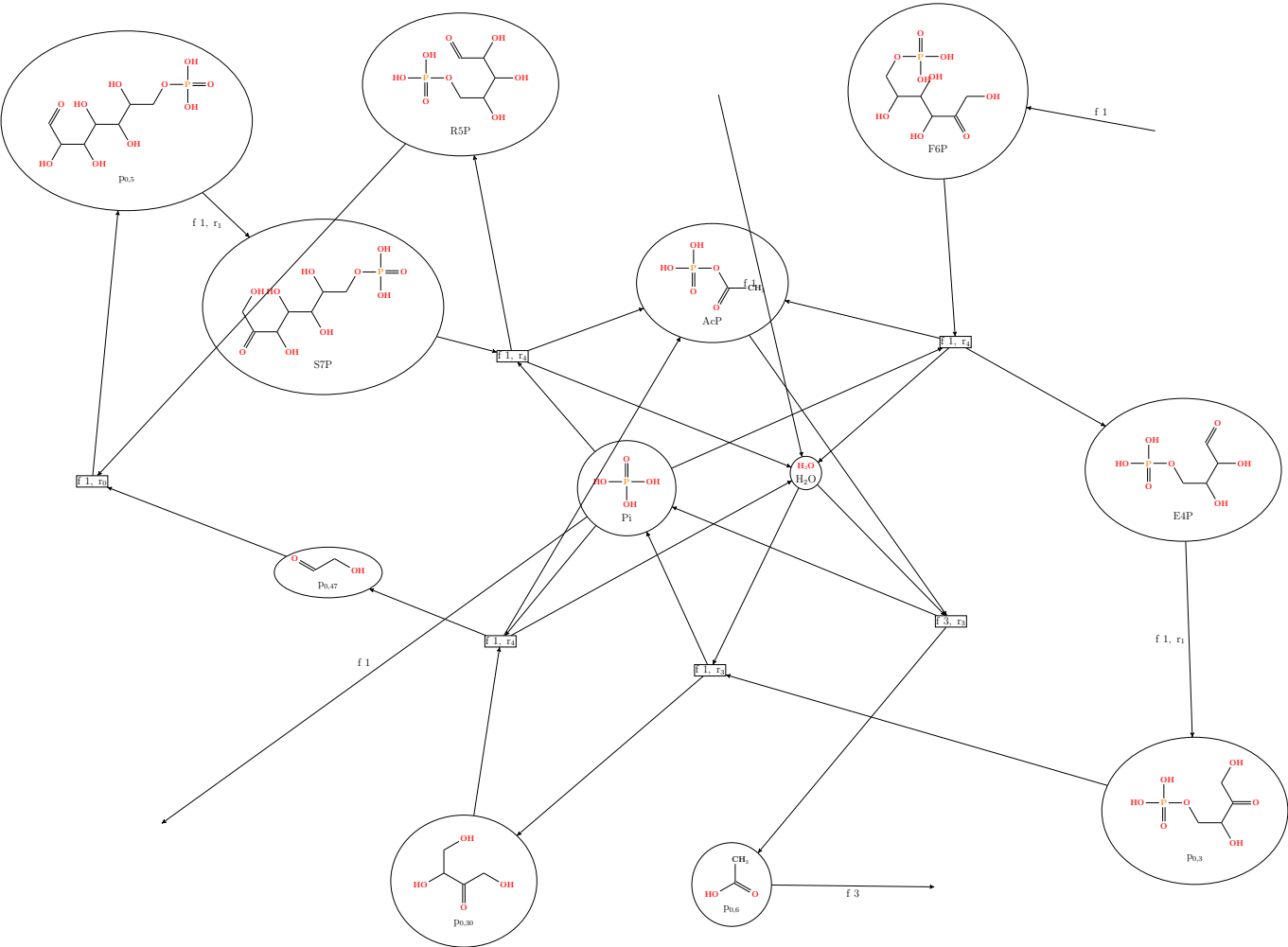
#### Overall Data

Objective value (integral): 10

Vertex/Graph In Out

F6P	1	0
H <sub>2</sub> O	1	0
Pi	0	1
p <sub>{0,6}</sub>	0	3

#### Filtered Graph



File: out/448\_dg\_0\_11100\_f\_0\_49\_filt

$$|E| = 8 \quad |P| = 10$$

### 0.7.42 Solution 50

#### Overall Data

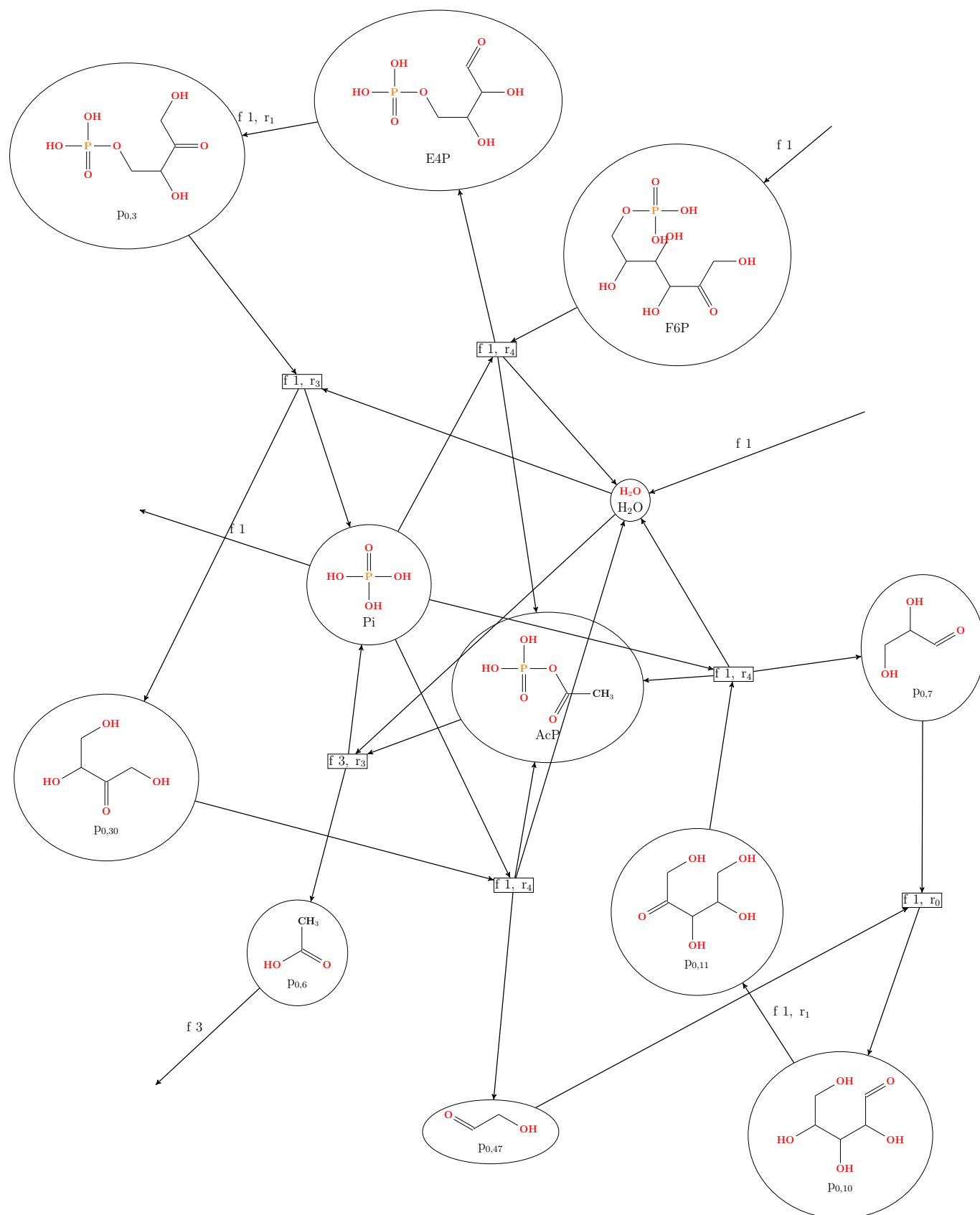
Objective value (integral): 10

Vertex/Graph In Out

F6P	1	0
-----	---	---

H <sub>2</sub> O	1	0
Pi	0	1
p <sub>{0,6}</sub>	0	3

## Filtered Graph



$$|E| = 8 \quad |P| = 10$$

### 0.7.43 Solution 51

#### Overall Data

Objective value (integral): 10

Vertex/Graph In Out

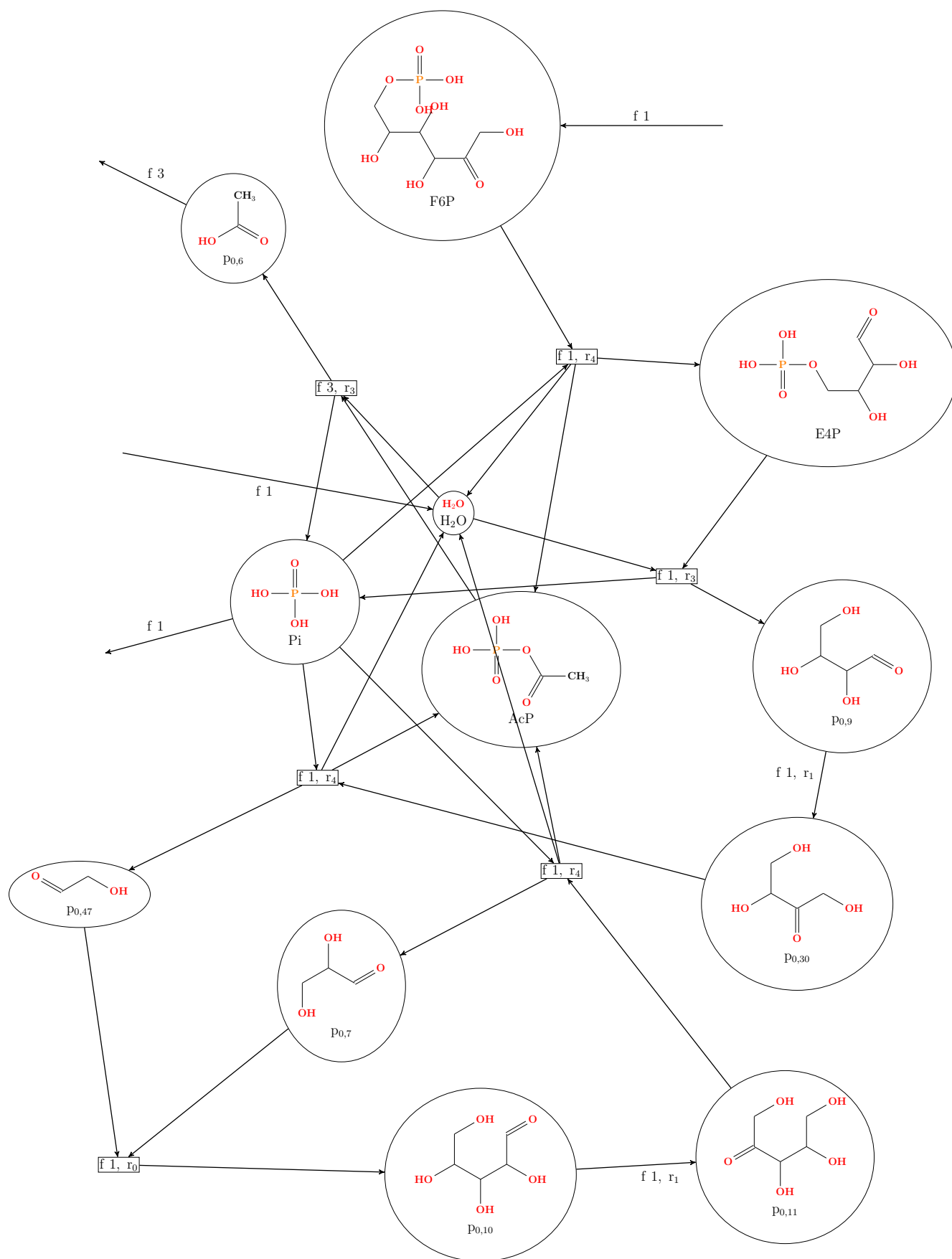
F6P 1 0

H\_20 1 0

Pi 0 1

p\_{0,6} 0 3

## Filtered Graph



File: out/458\_dg\_0\_11100\_f\_0\_51\_filt

$|E| = 8$   $|P| = 10$

## 0.7.44 Solution 52

### Overall Data

Objective value (integral): 10

Vertex/Graph	In	Out
--------------	----	-----

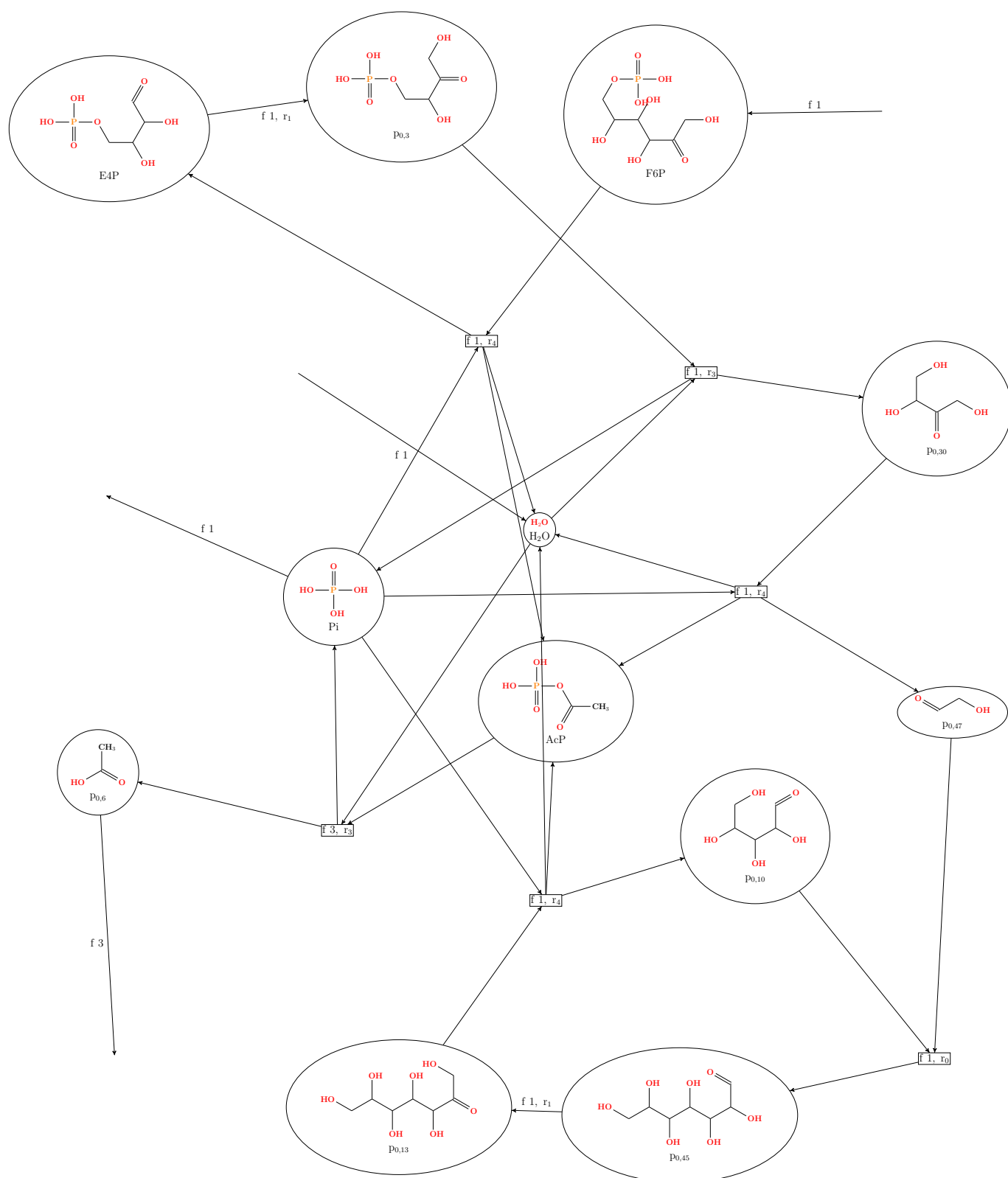
F6P	1	0
-----	---	---

H_20	1	0
------	---	---

Pi	0	1
----	---	---

p_{0,6}	0	3
---------	---	---

## Filtered Graph



File: out/463\_dg\_0\_11100\_f\_0\_52\_filt

$$|E| = 8 \quad |P| = 10$$

## 0.7.45 Solution 53

### Overall Data

Objective value (integral): 10

Vertex/Graph	In	Out
--------------	----	-----

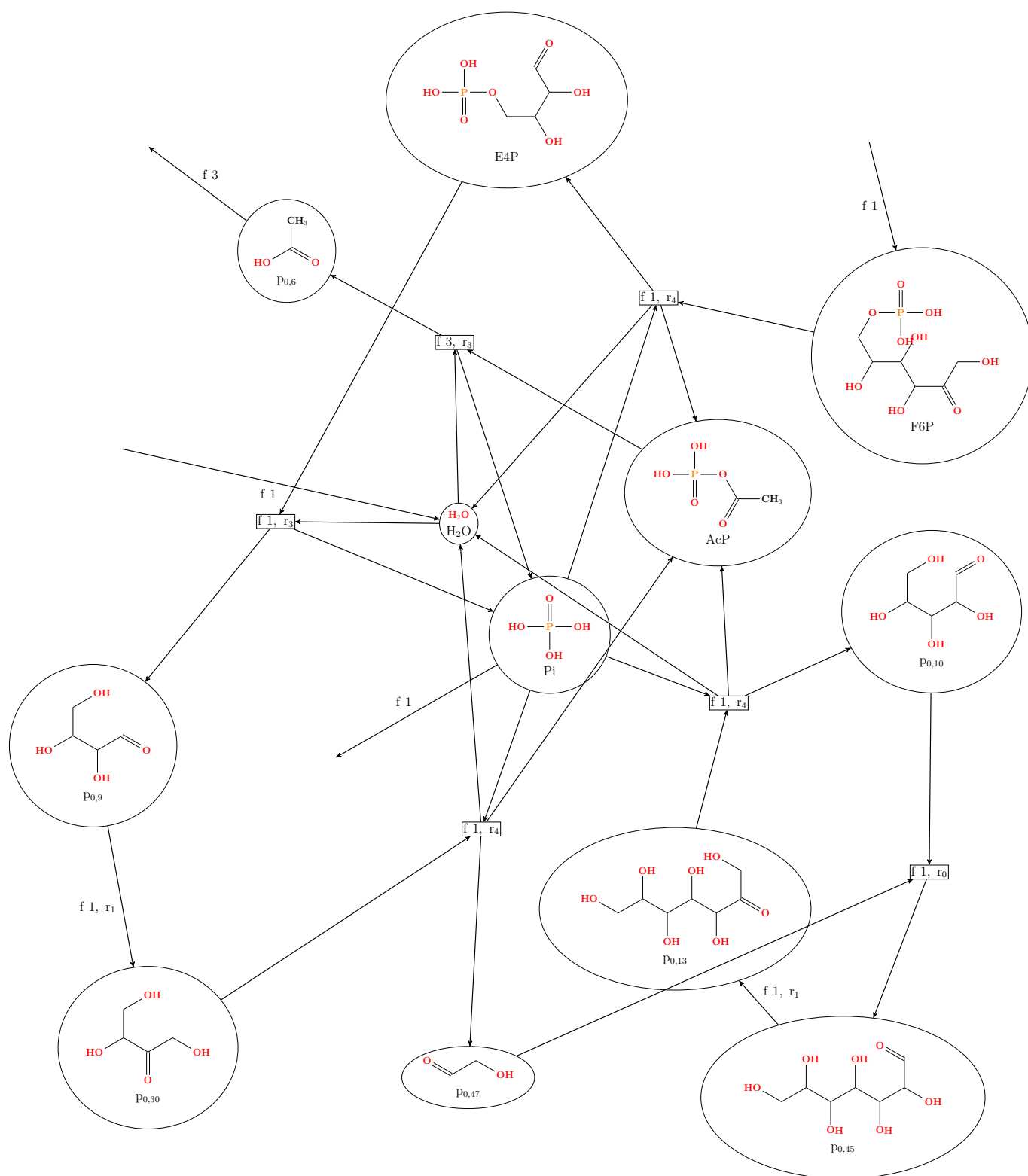
F6P	1	0
-----	---	---

H_20	1	0
------	---	---

Pi	0	1
----	---	---

p_{0,6}	0	3
---------	---	---

## Filtered Graph



File: out/468\_dg\_0\_11100\_f\_0\_53\_filt

$|E| = 8$   $|P| = 10$



## 0.7.46 Solution 54

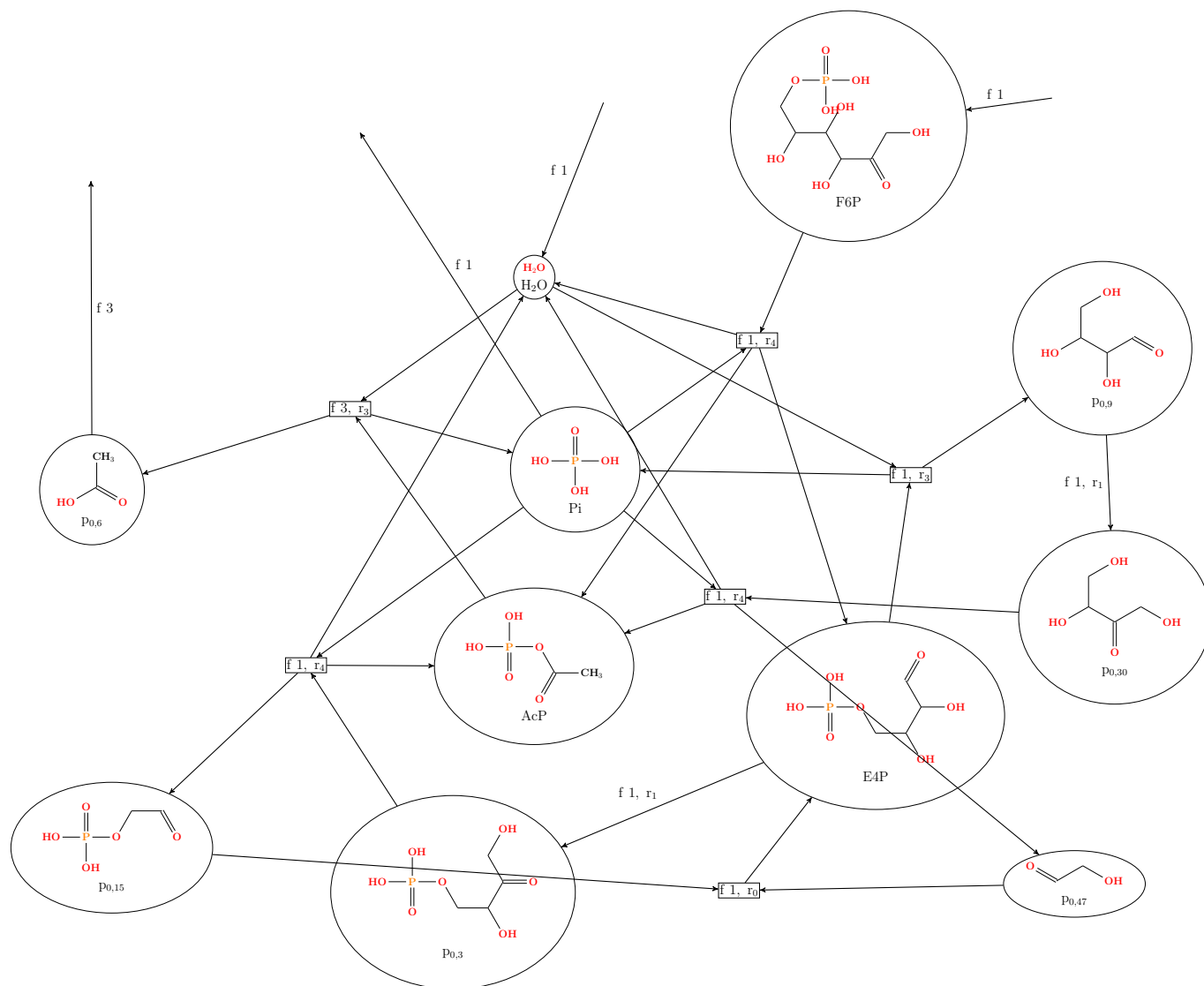
### Overall Data

Objective value (integral): 10

Vertex/Graph In Out

F6P	1	0
H <sub>2</sub> O	1	0
Pi	0	1
p <sub>{0,6}</sub>	0	3

### Filtered Graph



File: out/473\_dg\_0\_11100\_f\_0\_54\_filt

$$|E| = 8 \quad |P| = 10$$

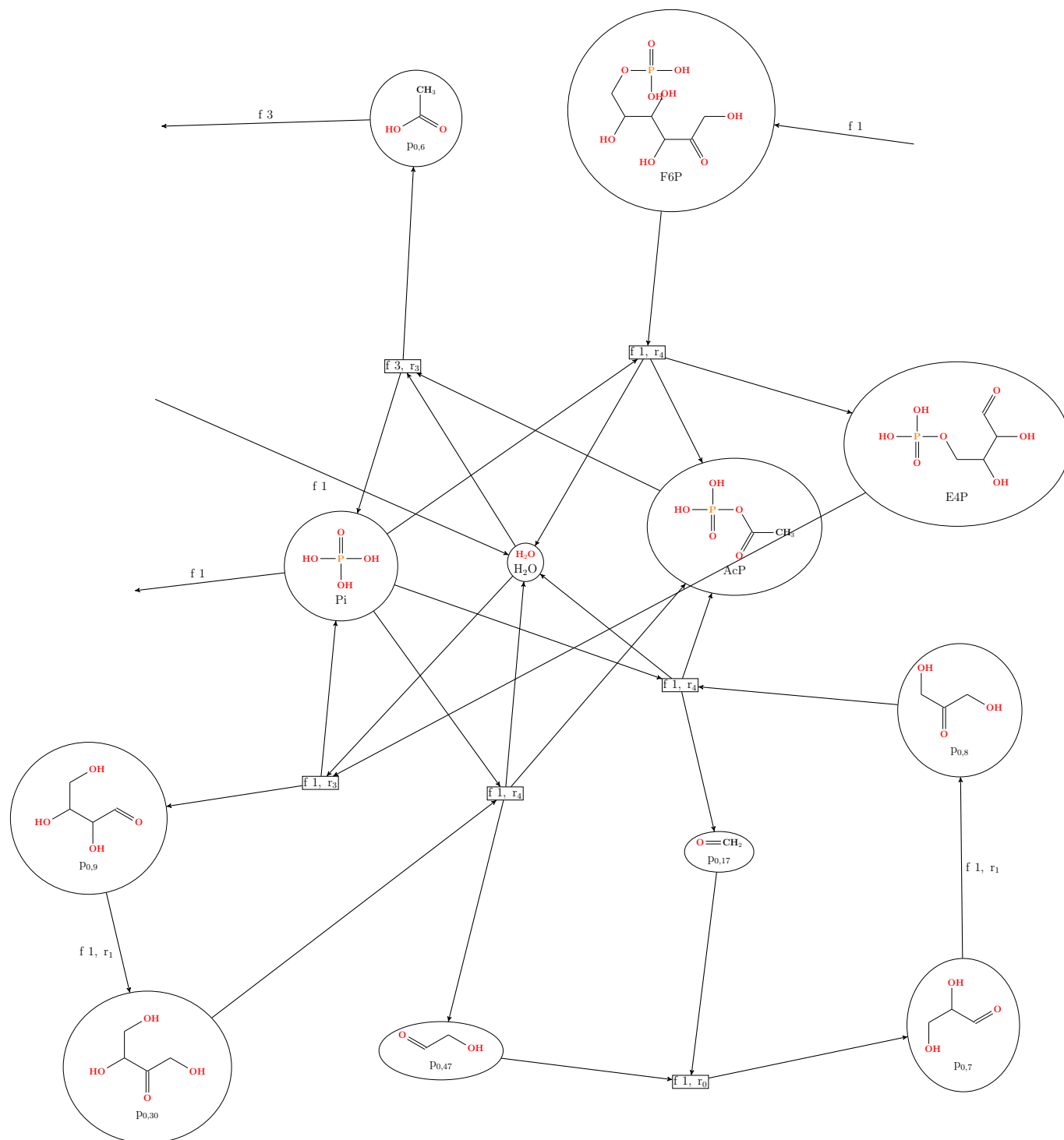
## 0.7.47 Solution 55

### Overall Data

Objective value (integral): 10

Vertex/Graph	In	Out
F6P	1	0
H_20	1	0
Pi	0	1
p_{0,6}	0	3

## Filtered Graph



File: out/478\_dg\_0\_11100\_f\_0\_55\_filt

$$|E| = 8 \quad |P| = 10$$

## 0.7.48 Solution 56

### Overall Data

Objective value (integral): 10

Vertex/Graph In Out

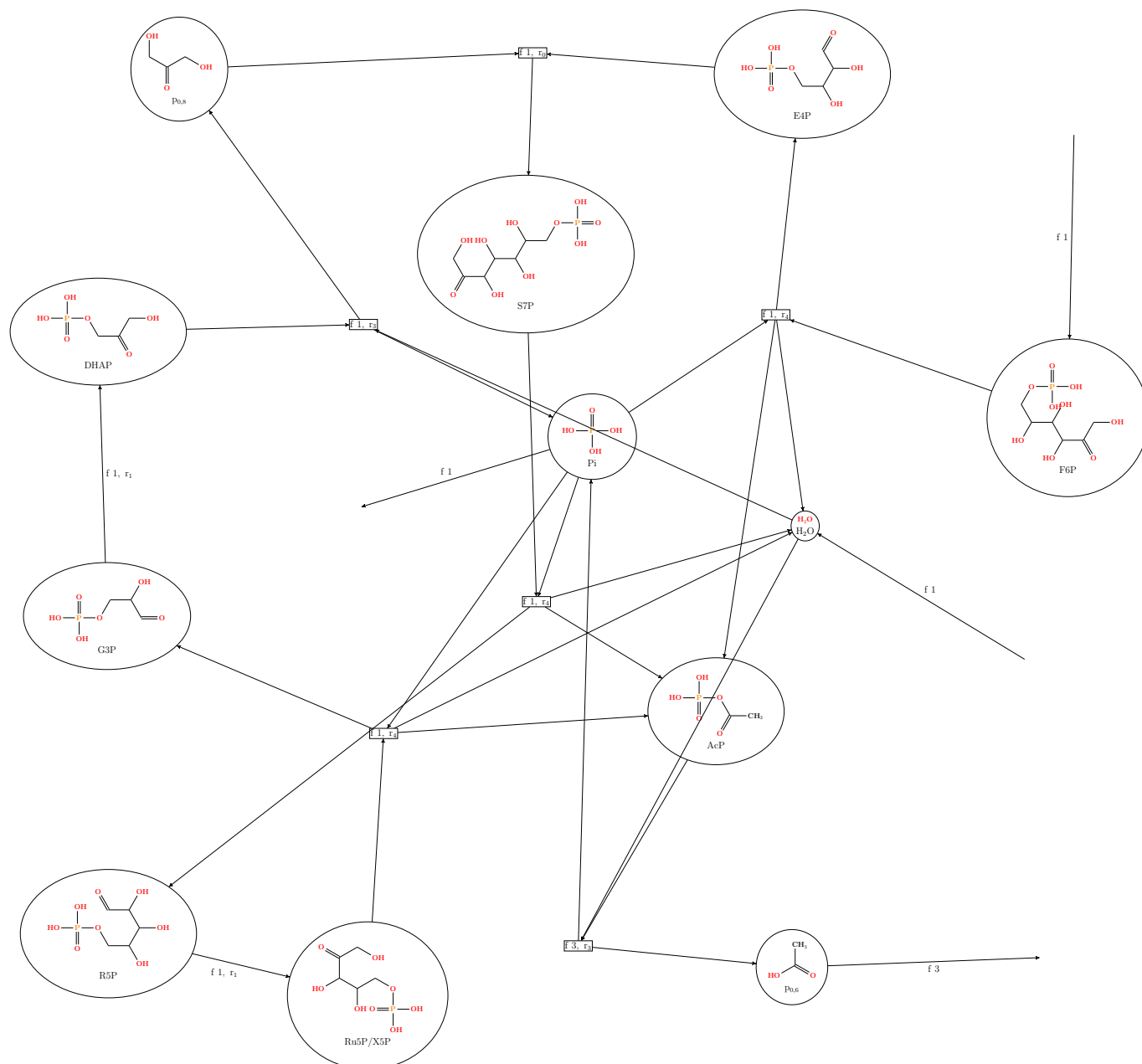
F6P 1 0

H<sub>2</sub>O 1 0

Pi 0 1

p<sub>{0,6}</sub> 0 3

### Filtered Graph



File: out/483\_dg\_0\_11100\_f\_0\_56\_filt

$$|E| = 8 \quad |P| = 10$$

## 0.7.49 Solution 57

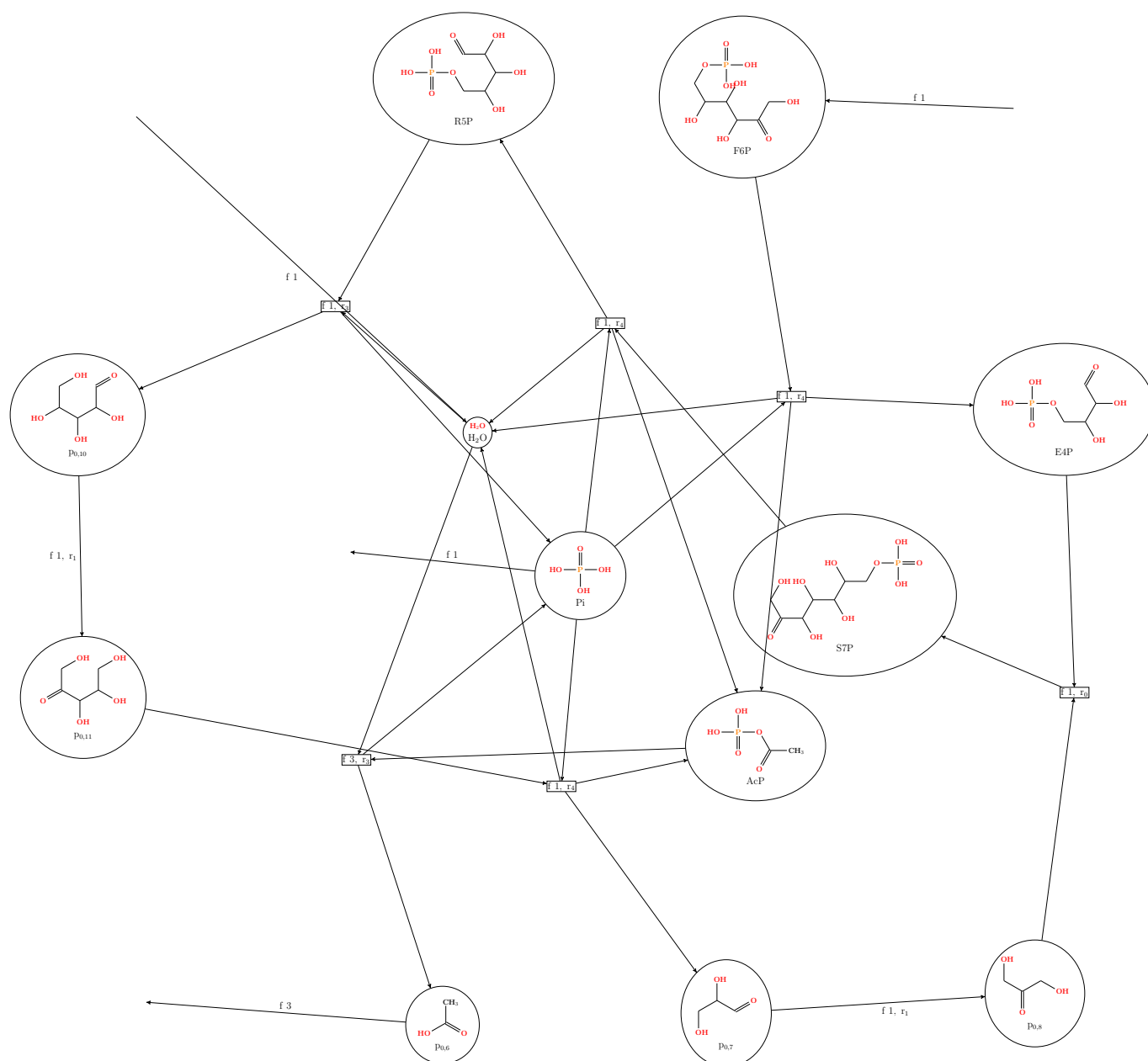
### Overall Data

Objective value (integral): 10

Vertex/Graph In Out

F6P	1	0
H <sub>2</sub> O	1	0
Pi	0	1
p <sub>{0,6}</sub>	0	3

### Filtered Graph



File: out/488\_dg\_0\_11100\_f\_0\_57\_filt

$$|E| = 8 \quad |P| = 10$$

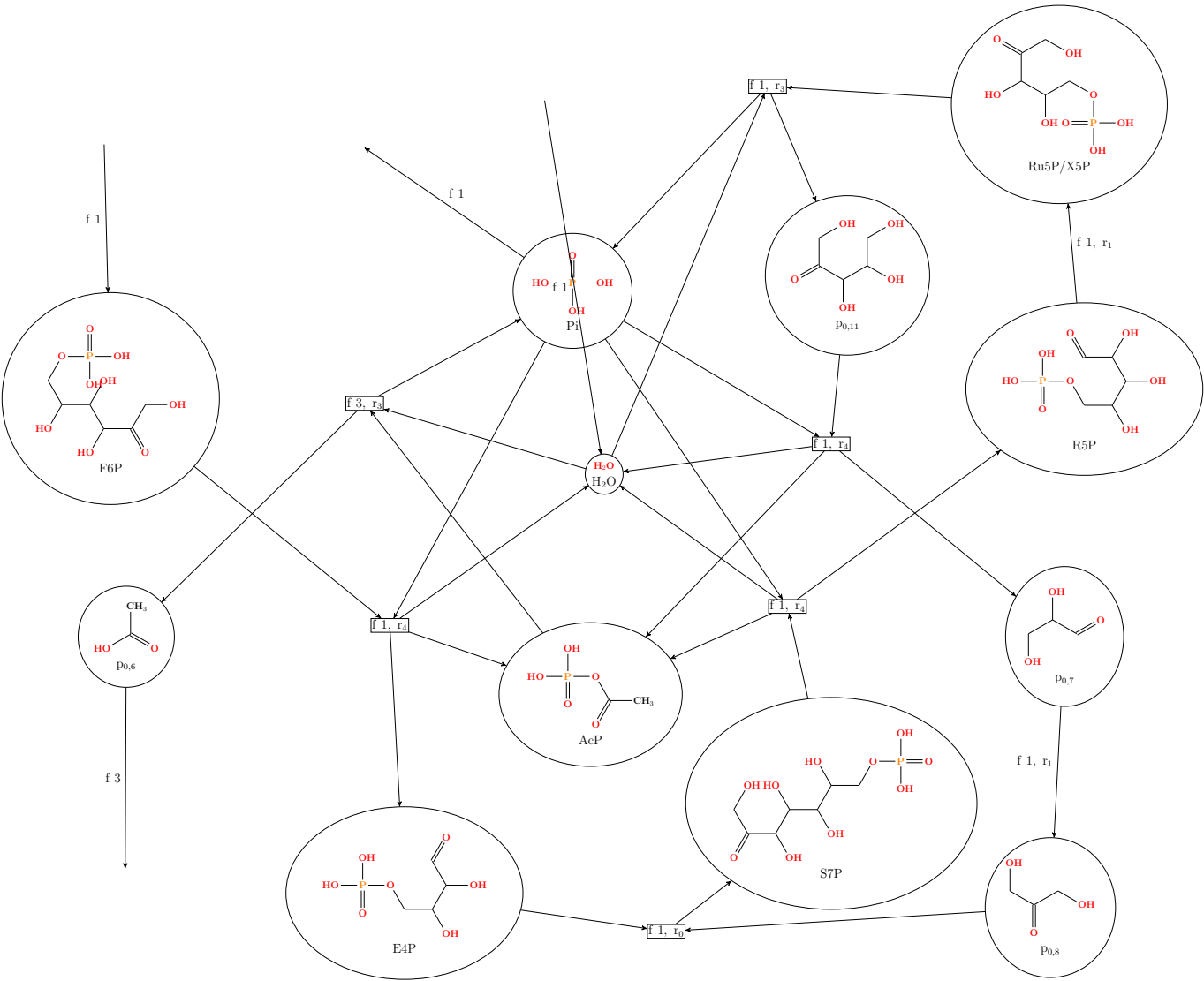
0.7.50    Solution 58

Overall Data

Objective value (integral): 10

Vertex/Graph	In	Out
F6P	1	0
H_20	1	0
Pi	0	1
p_{0,6}	0	3

Filtered Graph



File: out/493\_dg\_0\_11100\_f\_0\_58\_filt

$|E| = 8 \quad |P| = 10$

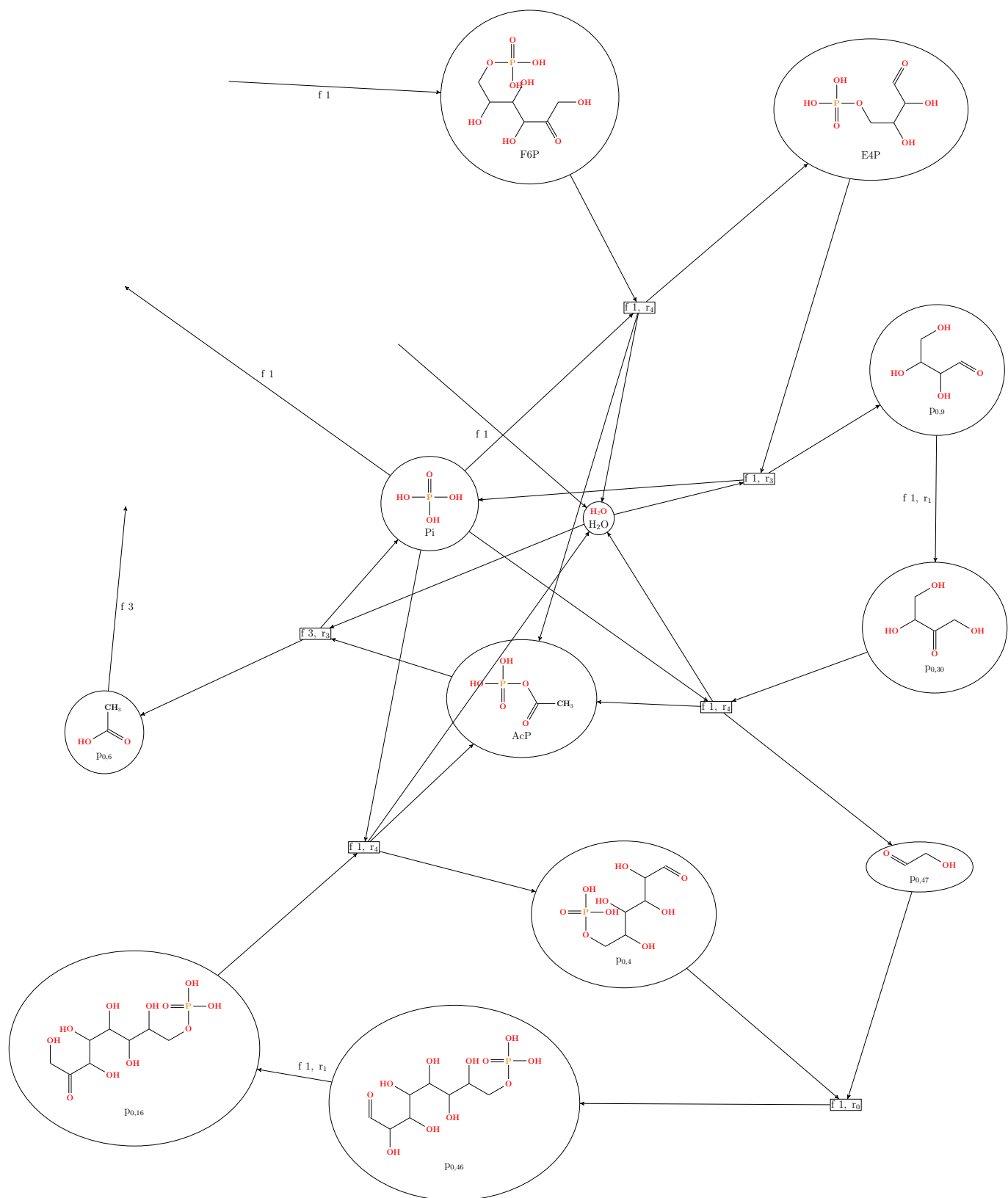
0.7.51    Solution 59

Overall Data

Objective value (integral): 10

Vertex/Graph	In	Out
F6P	1	0
H_20	1	0
Pi	0	1
p_{0,6}	0	3

## Filtered Graph



File: out/498\_dg\_0\_11100\_f\_0\_59\_filt

$$|E| = 8 \quad |P| = 10$$

## 0.7.52 Solution 60

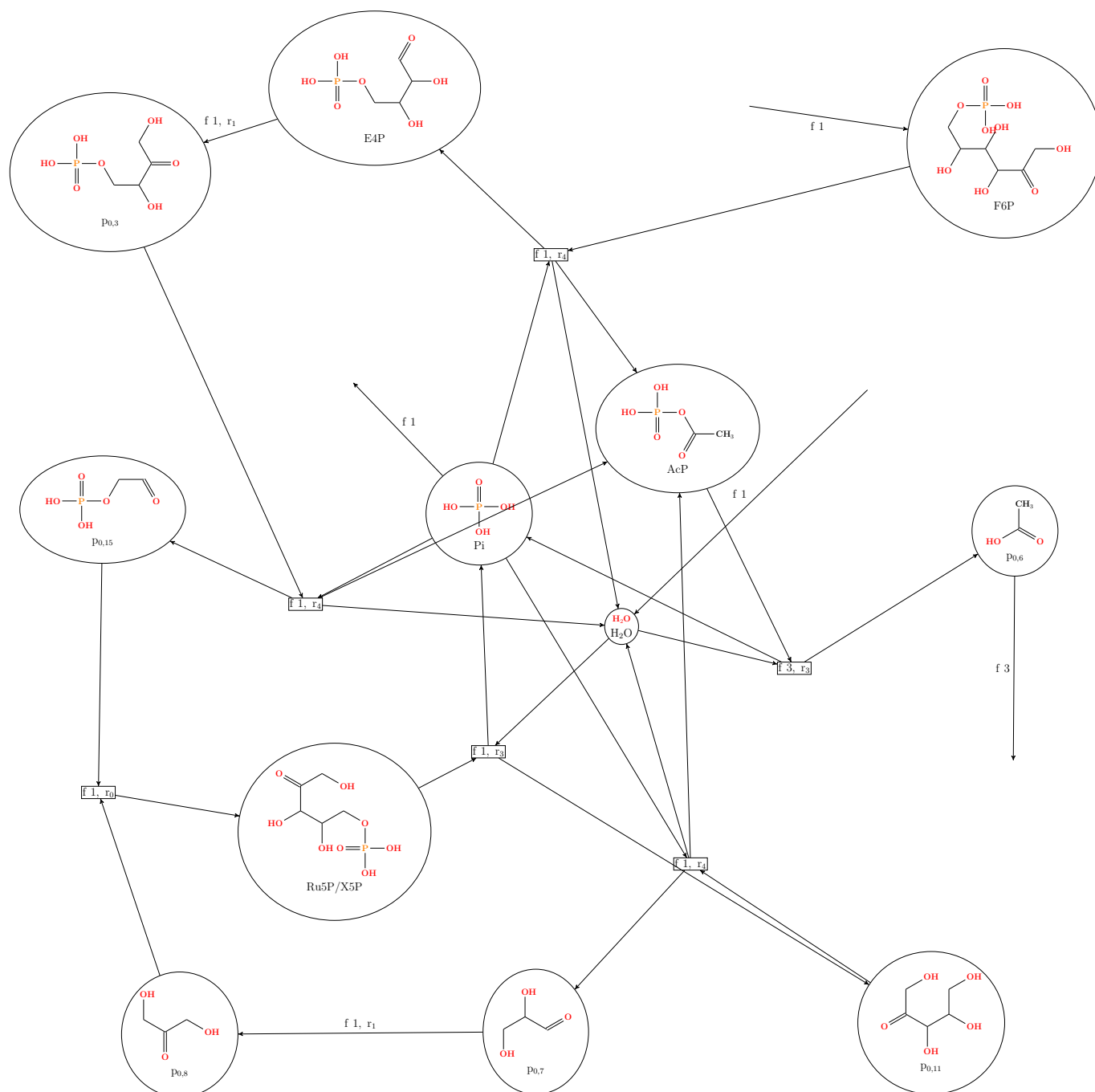
### Overall Data

Objective value (integral): 10

Vertex/Graph In Out

F6P	1	0
H <sub>2</sub> O	1	0
Pi	0	1
p <sub>{0,6}</sub>	0	3

### Filtered Graph



File: out/503\_dg\_0\_11100\_f\_0\_60\_filt

$$|E| = 8 \quad |P| = 10$$



**0.8 Enumerated Flows with 9 unique reactions**

**0.9 Enumerated Flows with 10 unique reactions**