

```

model=modelOri;
model = changeRxnBounds(model,'EX_glc(e)',-18.5,'1');%maxglucoseuptake
model = changeRxnBounds(model,'EX_o2(e)',-1000,'1');%oxygenunlimited
model = changeObjective(model,'Biomass_Ecoli_core_N(w/GAM)-Nmet2');%objectivefunc
FBAolution = optimizeCbModel(model,'max')
FBAolution.f
FBAolution.v
fluxData = FBAolution.v;
nonZeroFlag = 1;
printFluxVector(model, fluxData, nonZeroFlag)
model = changeRxnBounds(model,'EX_o2(e)',0,'1');
FBAolution2 = optimizeCbModel(model,'max');
FBAolution2.f

```

FBAolution =

struct with fields:

```

origStatText: []
    f: 1.6531
   f0: NaN
   f1: 1.6531
   f2: NaN
    v: [95×1 double]
    y: [72×1 double]
    w: [95×1 double]
    s: [72×1 double]
 solver: 'glpk'
algorithm: 'default'
   stat: 1
origStat: 5
   time: 0.0140
  basis: []
 vars_v: []
    x: [95×1 double]

```

ans =

```

1.6531

```

ans =

```

0
0
0.0000
10.3657
10.3657
0
0
8.5822
0
0
8.3900
80.6069
1.6531

```

-40.6527  
10.3657  
77.4832  
0  
26.8391  
0  
0  
0  
0  
40.6527  
0  
0  
0  
0  
-18.5000  
0  
0  
52.6943  
33.1606  
0  
0  
-9.0139  
-38.7416  
-6.0812  
0  
0  
13.5621  
0  
0  
0.0000  
0  
0  
8.5822  
0  
9.8808  
29.3120  
18.5000  
0.4227  
0  
-8.5912  
0  
0  
0  
9.8808  
-52.6943  
10.3657  
0  
0  
0  
0  
8.5822  
0  
0  
68.9010  
0  
9.0139  
38.7416  
16.5611  
13.5621  
0.0000  
8.2804

-29.3120  
 9.8808  
 -26.8391  
 6.0812  
 4.7370  
 0  
 0  
 -0.0000  
 2.7439  
 0  
 5.3990  
 -4.4818  
 0  
 0  
 8.5822  
 -8.5822  
 2.9979  
 0  
 2.9979  
 2.4011  
 13.5621

ACKr	3.658e-29	
ACONTa	10.37	
ACONTb	10.37	
AKGDH	8.582	
ATPM	8.39	
ATPS4r	80.61	
Biomass_Ecoli_core_N(w/GAM)-Nmet2		1.653
CO2t	-40.65	
CS	10.37	
CYTBD	77.48	
ENO	26.84	
EX_co2(e)	40.65	
EX_glc(e)	-18.5	
EX_h2o(e)	52.69	
EX_h(e)	33.16	
EX_nh4(e)	-9.014	
EX_o2(e)	-38.74	
EX_pi(e)	-6.081	
FBA	13.56	
FORTi	6.374e-30	
FUM	8.582	
G6PDH2r	9.881	
GAPD	29.31	
GLCpts	18.5	
GLNS	0.4227	
GLUDy	-8.591	
GND	9.881	
H2Ot	-52.69	
ICDHyr	10.37	
MDH	8.582	
NADH16	68.9	
NH4t	9.014	
O2t	38.74	
PDH	16.56	
PFK	13.56	
PFL	6.374e-30	
PGI	8.28	
PGK	-29.31	
PGL	9.881	

PGM	-26.84
PIt2r	6.081
PPC	4.737
PTAr	-3.692e-29
PYK	2.744
RPE	5.399
RPI	-4.482
SUCDi	8.582
SUCOAS	-8.582
TALA	2.998
TKT1	2.998
TKT2	2.401
TPI	13.56

ans =

0.4706