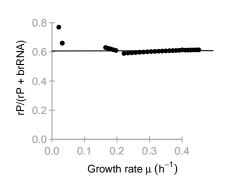
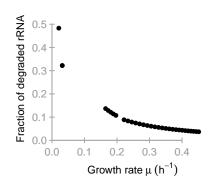
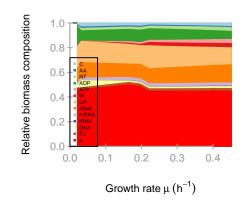
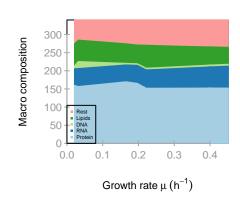


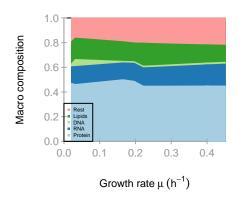
Protein mass fraction in ribosome

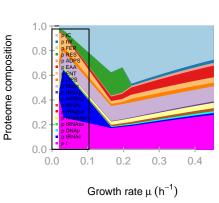


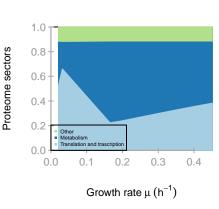




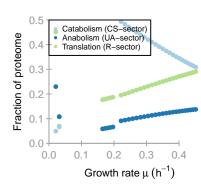












| | tC | tW | FER | RES | ADPS | EAA | ENT | LIPS | Maint | rRNAp | mRNAp | tRNAp | rRNase | mRNase | tRNAse | DNAp | tRNAc | r |
|------|------|----|-----|-------|------|-----|--------|-------|-------|-------|-------|-------|--------|--------|--------|------|-------|-------|
| С | 0.2 | 0 | -1 | -0.02 | 0 | -1 | -0.167 | -0.18 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AA | 0 | 0 | 0 | 0 | 0 | 1 | -0.167 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -0.01 | 0 |
| NT | 0 | 0 | 0 | 0 | -1 | 0 | 0.334 | 0 | 0 | -1 | -1 | -1 | 1 | 1 | 1 | -1 | 0 | 0 |
| ADP | -0.8 | 0 | 0 | -0.98 | 1 | 0 | 0.666 | 0.82 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.05 | 0.05 |
| ATP | 8.0 | 0 | 0 | 0.98 | 0 | 0 | -0.666 | -0.82 | -1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -0.05 | -0.05 |
| W | 0 | -1 | 1 | 0.02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| LIP | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.18 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| rRNA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | -1 | 0 | 0 | 0 | 0 | 0 |
| mRNA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | -1 | 0 | 0 | 0 | 0 |
| tRNA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | -1 | 0 | -0.94 | 0.94 |
| DNA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| TC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.95 | -0.95 |
| р | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.01 |

| | tC | tW | FER | RES | ADPS | EAA | ENT | LIPS | Maint | rRNAp | mRNAp | tRNAp | rRNase | mRNase | tRNAse | DNAp | tRNAc | r |
|------|-----|----|-----|-----|------|-----|-----|------|-------|-------|-------|-------|--------|--------|--------|------|-------|---|
| x_C | 0.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| x_W | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| С | 6 | 0 | 2 | 2 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AA | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| NT | 0 | 0 | 0 | 0 | 2 | 0 | 5 | 0 | 0 | 2 | 2 | 2 | 5 | 0 | 0 | 2 | 0 | 0 |
| ADP | 2 | 0 | 0 | 2 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ATP | 7 | 0 | 0 | 7 | 0 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 |
| W | 0 | 13 | 0 | 37 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| LIP | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 70 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| rRNA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 35 | 0 | 0 | 12 | 0 | 0 | 0 | 0 | 0 |
| mRNA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| tRNA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| DNA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 |
| р | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| | tC | tW | FER | RES | ADPS | EAA | ENT | LIPS | Maint | rRNAp | mRNAp | tRNAp | rRNase | mRNase | tRNAse | DNAp | tRNAc | r |
|------|----|----|-----|-----|------|-----|-----|------|-------|-------|-------|-------|--------|--------|--------|------|-------|----|
| x_C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Ö | Ō | Ō | 0 | 0 | 0 | Ö | 0 | 0 |
| x_W | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| С | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ADP | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ATP | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| W | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| LIP | 35 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| rRNA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 45 |
| mRNA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| tRNA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| DNA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 2 | 0 | 0 |
| TC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| р | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

kcat

| | tC | tW | FER | RES | ADPS | EAA | ENT | LIPS | Maint | rRNAp | mRNAp | tRNAp | rRNase | mRNase | tRNAse | DNAp | tRNAc | r |
|-------|-----|-----|-----|-----|------|-----|-----|------|-------|-------|-------|-------|--------|--------|--------|------|-------|-----|
| kcatf | 116 | 114 | 181 | 10 | 7 | 10 | 61 | 40 | 10 | 27 | 2 | 2 | 10 | 10 | 10 | 2 | 11853 | 593 |
| kcath | 12 | 11 | 18 | 1 | 1 | 1 | 6 | 4 | Λ | Λ | 0 | 0 | Λ | 0 | 0 | 0 | 0 | 0 |

Keq



phi input

[,10] 0.01

[,11] 0.01 **[,12]** 0.01 **[,13]** 0.001 **[,14]** 0.001 **[,15]** 0.001 **[,16]** 0.02 **[,17]** 0.02 **[,18]** 0.3

[,8] 0.1 **[,9]** 0.122

[,4] 0.05

[,3] 0.01

[1,]

[,5] 0.01 **[,6]** 0.15

[,7] 0.04

average saturation input

minimal phi constraint

[,9] [,10] [,11] [,12] 0.122 0 0 0

[,15] [,16] [,17] 0.001 0 0

[,18] 0

| | P | • | ••• |
|------|---|-------|---------|
| | | | |

[8,] 0

[,1] [,2] [,3] [,4] [,5] [,6] [,7] 0 0 0 0 0 0

| minimal f con | straint |
|---------------|---------|
|---------------|---------|

[1,]