





0.8 0.6 0.6 0.4 0.2 0.4 0.6 0.8 1.0 Growth rate μ (h⁻¹)

maintenance_fun constant

keep_ribosome_kcat FALSE keep_transport_kcat FALSE

| | tC | tC2 | RESP | FERM | EAA | ENT | RNAp | DNAp | r |
|-----|----|-----|------|------|-----|------|------|------|------|
| С | 1 | 1 | -1 | -1 | 0 | 0 | Ō | Ō | 0 |
| I | 0 | 0 | 0.4 | 0.2 | -1 | -0.9 | 0 | 0 | 0 |
| AA | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | -0.8 |
| NT | 0 | 0 | 0 | 0 | 0 | 1 | -1 | -1 | 0 |
| ATP | 0 | 0 | 0.2 | 0.1 | 0 | -0.1 | 0 | 0 | -0.2 |
| RNA | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| DNA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| р | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |

| | tC | tC2 | RESP | FERM | EAA | ENT | RNAp | DNAp | r |
|-------|-----|-----|------|------|-----|-----|------|------|----|
| x_C | 0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| x_W | 0 | 0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| С | 0 | 0 | 0.4 | 2 | 0 | 0 | 0 | 0 | 0 |
| I | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| AA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| NT | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| ATP | 0 | 0 | 0 | 0 | 0 | 18 | 0 | 0 | 18 |
| RNA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| DNA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| р | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

KA

| | tC | tC2 | RESP | FERM | EAA | ENT | RNAp | DNAp | r |
|-------|----|-----|------|------|-----|-----|------|------|----|
| x_C | 0 | 0 | 0 | 0 | 0 | 0 | Ō | Ō | 0 |
| x_W | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| С | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| I | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ATP | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| RNA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 |
| DNA | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 4 | 0 |
| р | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

kcat

| | tC | tC2 | RESP | FERM | EAA | ENT | RNAp | DNAp | r |
|-------|------|------|------|------|-----|------|------|------|-----|
| kcatf | 69.3 | 12.2 | 16.2 | 81.1 | 4.8 | 36.5 | 7.2 | 9.7 | 4.8 |
| kcatb | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Keq



phi input

| [1,] | [,1] 0.06 | [,2] 0.005 | [,3] 0.065 | [,4] 0.004 | [,5] 0.248 | [,6] 0.035 | [,7] 0.119 | [,8] 0.003 | [,9 0.461 |
|------|---------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|---------------------|

average saturation input

minimal phi constraint

[1,]

minimal f constraint

| | [,1] | [,2] | [,3] | [,4] | [,5] | [,6] | [,7] | [,8] | [,9] |
|------|------|------|------|------|------|------|------|------|------|
| [1,] | Ō | Ō | Ō | Ō | Ō | Ō | Ō | Ō | Ō |