|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sim Letter | Avg. Inst.G.R (h-1) | Het. Prod. Rate (min-1) | Sim Letter | Avg. Inst.G.R (h-1) | Het. Prod. Rate (min-1) | Sim Letter | Avg. Inst.G.R (h-1) | Het. Prod. Rate (min-1) |
|  | 1.5814 | 597.1083 |  | 1.5367 | 580.1339 |  | 1.5761 | 624.2268 |
|  | 1.3630 | 1556.5827 |  | 1.3451 | 1596.6763 |  | 1.3324 | 1568.3884 |
|  | 1.0405 | 3546.2154 |  | 0.9856 | 3572.7139 |  | 0.9700 | 3370.5082 |
|  | 1.4081 | 1635.6896 |  | 1.3800 | 1571.6182 |  | 1.2820 | 1435.0105 |
|  | 1.0484 | 3487.1399 |  | 0.9353 | 3358.7260 |  | 0.9653 | 3374.6538 |
|  | 0.5928 | 6052.4500 |  | 0.5187 | 6592.1398 |  | 0.5119 | 6702.1731 |
|  | 1.0691 | 3455.7847 |  | 0.9723 | 3014.3955 |  | 0.9168 | 3415.6120 |
|  | 0.6180 | 5952.7284 |  | 0.5105 | 6638.1982 |  | 0.4903 | 6531.3345 |
|  | 0.2437 | 9407.3967 |  | 0.2036 | 8358.0351 |  | 0.2091 | 8316.0070 |
| Table 3: Simulation results (average instantaneous growth rate and heterologous protein production rate per cell) for various settings detailed in Tables 3-5. **Slow codon relative elongation speed is 0.03**. Once the convergence of values is established, the most important result is growth rate and heterologous production rate, which determine heterologous protein yield. | | | | | | | | |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sim Letter | Avg. Inst.G.R (h-1) | Het. Prod. Rate (min-1) | Sim Letter | Avg. Inst.G.R (h-1) | Het. Prod. Rate (min-1) | Sim Letter | Avg. Inst.G. R (h-1) | Het. Prod. Rate (min-1) |
|  | 1.5814 | 597.1083 |  | 1.3936 | 455.5686 |  | 1.300 | 532.6062 |
|  | 1.3630 | 1556.5827 |  | 1.1674 | 1458.4226 |  | 1.1241 | 1446.6075 |
|  | 1.0405 | 3546.2154 |  | 0.7063 | 2838.1375 |  | 0.7058 | 2833.3133 |
|  | 1.4081 | 1635.6896 |  | 1.0256 | 1119.1004 |  | 0.8476 | 1097.4706 |
|  | 1.0484 | 3487.1399 |  | 0.5718 | 2241.5672 |  | 0.5528 | 2184.3125 |
|  | 0.5928 | 6052.4500 |  | 0.2741 | 3253.6470 |  | 0.2641 | 3225.3294 |
|  | 1.0691 | 3455.7847 |  | 0.4203 | 1386.6597 |  | 0.3023 | 1216.8896 |
|  | 0.6180 | 5952.7284 |  | 0.2042 | 2395.7468 |  | 0.1945 | 2341.2621 |
|  | 0.2437 | 9407.3967 |  | 0.0944 | 3367.2594 |  | 0.0933 | 3368.5477 |
| Table 4: Simulation results (average instantaneous growth rate and heterologous protein production rate per cell) for various settings detailed in the previous tables. Slow codon relative elongation speed is 0.005. Once the convergence of values is established, the most important result is growth rate and heterologous production rate, which determine heterologous protein yield. | | | | | | | | |

Our notation for Table 3 and 4 is the following: means that the synthetic transcript does not contain any slow codon and *a* and *b* denote the promoter and RBS strength as mentioned above. means that the synthetic construct has a slow codon (either with relative elongation speed 0.03 or 0.005) at the 5th ribosome site (out of 30). means that the synthetic construct has a slow codon (either with relative elongation speed 0.03 or 0.005) at the 26th ribosome site (out of 30).

Avg. Inst.G.R (h-1) is avg\_inst\_growth\_rate from the simulation results.

Het. Prod. Rate (min-1) is obtained via *production\_rate(:,4)*

All results seem to have converged. Convergence can be seen by loading the corresponding *.mat* file and calling *plot(time\_ss, P\_count\_vec\_array(:,4))*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sim Letter | Avg. Inst.G.R (h-1) | Het. Prod. Rate (min-1) | Sim Letter | Avg. Inst.G.R (h-1) | Het. Prod. Rate (min-1) | Sim Letter | Avg. Inst.G. R (h-1) | Het. Prod. Rate (min-1) |
|  | 1.463 | 546.2015 |  | 1.3569 | 462.5374 |  | 1.2848 | 516.1401 |
|  | 1.1344 | 1287.9410 |  | 0.9964 | 1216.9522 |  | 0.9698 | 1258.4311 |
|  | 0.7682 | 2636.7526 |  | 0.5535 | 2355.0829 |  | 0.5496 | 2371.9027 |
|  | 1.2096 | 1342.7319 |  | 0.9346 | 1063.9225 |  | 0.8105 | 1066.8557 |
|  | 0.7636 | 2677.9196 |  | 0.5211 | 2063.7984 |  | 0.4955 | 2035.5117 |
|  | 0.3643 | 3977.1902 |  | 0.2372 | 2914.3025 |  | 0.2374 | 2907.8569 |
|  | 0.7745 | 2525.8254 |  | 0.4078 | 1368.8145 |  | 0.3018 | 1193.8353 |
|  | 0.3639 | 4042.7620 |  | 0.1919 | 2294.8271 |  | 0.1877 | 2257.4362 |
|  | 0.1290 | 5226.7137 |  | 0.086 | 3086.0197 |  | 0.0859 | 3095.8760 |
| Table 5: Simulation results (average instantaneous growth rate and heterologous protein production rate per cell) for various settings detailed in the previous tables. Slow codon relative elongation speed is 0.005 and mRNA has 60 ribosome places. Once the convergence of values is established, the most important result is growth rate and heterologous production rate, which determine heterologous protein yield. | | | | | | | | |