**6 Appendix:**

Some important parameters in the model:

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Value | Unit | Description |
| p | 0.1 | min-1 | Permeability of cell wall |
| KFeFUR | 0.01 | m-1$∙$s-1 | Formation constant of FeFur complex |
| dff | 0.001 | min-1 | FeFUR degradation rate |
| Km | 0.1 | min-1 | Translation rate of Mcherry |
| NA | 6.02\*1020 | mol-1 | Avogadro’s constant |
| V | 6.5\*10-16 | m3 | Volume of a bacterium |
| DMrna | 0.001 | min-1 | mRNA degradation rate |
| KL | 2 | min-1 | production rate of LacI |
| DLacI | 10-3 | min-1 | LacI degradation rate |
| Kf | 10-4 | min-1 | fixation rate of FeFUR |
| Fur0 | 0.01 | mM$∙$min-1 | Fur Production rate |
| Npla1 | 400 | Nb/cell | pET28-a plasmid number |
| Npla2 | 400 | Nb/cell | pET28-a plasmid number |
| Ki1 | 7.4\*10-4 | min-1 | Sensor efficiency |
| Ki2 | 25 | min-1 | Inverter efficiency |