**Appendix 3 – Supplementary File 1**

|  |  |
| --- | --- |
| Model A | Model B  |
| $$\frac{dX}{dt}=r\_{1}α\_{RNAP}Y$$$$r\_{1}=θ\_{RNAP}β\_{mRNA}/T\_{RNAP}$$$$α\_{RNAP}=\frac{[Z]}{K\_{1}+[Z]}$$ | $$\frac{dX}{dt}=r\_{1}^{\*}α\_{RNAP}Y$$$$r\_{1}^{\*}=[θ\_{RNAP}+bcc'(Y-Y\_{o})] β\_{mRNA}/T\_{RNAP}$$$$α\_{RNAP}\left(\left[P\right],\left[Q\right]\right)=1-\left(\sqrt{f\_{1}^{2}+f\_{2}}-f\_{1}\right)$$$f\_{1}≡\frac{1+A\left[Q\right]-B[P]}{2B[P]}$, $f\_{2}≡\frac{1}{B\left[P\right]} $ $A≡\frac{k\_{1}}{k\_{-1}+k\_{2}}\left(1+\frac{k\_{2}}{k\_{3}}\right)$, $B≡\frac{k\_{1}}{k\_{-1}+k\_{2}}$$$\left[P\right]=\frac{1}{c}[θ\_{RNAP}+bcc'(Y-Y\_{o})] $$$$\left[Q\right]=n\_{Q}[Z]$$ |