**Supplemental Table 3.** CPM Mathematical Implementation

|  |  |  |  |
| --- | --- | --- | --- |
| **Representation** | **Mathematical Formulation** | **Equation Terms** | **Explanation** |
| Contact Energy (H1) | $$\sum\_{ }^{ }J\left(τ\_{\left(σ\left(i\right)\right),}τ\_{\left(σ\left(j\right)\right)}\right)\left(1-δ\_{\left(σ\left(i\right)\right),\left(σ\left(j\right)\right)}\right)$$ | J | Contact Coefficient |
| $σ\left(i\right)$,$σ\left(j\right)$ | Neighboring lattice sites of individual cells |
| t | Cell types |
| $$δ$$ | Kronecker delta, localizes contact energy contributions to cell-cell interfaces |
| Volume constraint (H2) | $$λ\_{volume}\left(V\_{cell} -  V\_{target}  \right)^{2}$$ | $$λ\_{volume}$$ | Volume constraint scaling factor |
| Logarithmic chemotaxis (H3) | $$\sum\_{c}^{}\frac{λ\_{c}\left(τ\left(σ\left(y\_{i},t\right),t\right)\right)c\left(y\_{i},t\right)}{1 + c\_{CM}\left(σ\left(y\_{i},t\right),t\right)}$$ | $$λ\_{c}$$ | Chemotaxis Parameter |
| *c* | Chemical field concentration |
| $$c\_{CM}$$ | Cell body centroid from which chemotaxis behaviors are calculated |
| t | Cell types |
| $$t$$ | Time |
| $$y\_{i}$$ | Lattice site |
| Diffusion of chemical species | $$\frac{∂c}{∂t}=D∇^{2}c+kc+S$$ | *c* | Chemical field concentration |
| *k* | Decay constant |
| *D* | Diffusion constant |
| *S* | Secretion |