Each potential in a syncytium S at position (i,j) obeys nonlinear differential equation (1)

$$\frac{dS_{ij}}{dt} = -MS_{ij} + \sum_{(p,q)\in N_{ij}} (S_{pq} - S_{ij}) P_{pqij} + X_{ij} \qquad (1)$$

where $X_{i,j}$ represent FCS activity at location i,j.

M – passive decay

The diffusion coefficients P, which regulate conductivity between locations i,j and p,q are computed from BCS activity at respective locations as

$$P_{pqij} = \frac{\delta}{1 + e(Z_{ij} + Z_{pq})} \qquad (2)$$

where δ and e are parameters controlling diffusion speed.

The set of N_{ij} locations defines neighborhood to which locations i,j is directly coupled in the syncsytium as

N_{ij}= {(i,j-1), (i-1,j), (i+1,j), (i,j+1)} (3)

At equilibrium each S_{ij} is computed as the solution of a set of equations:

$$S_{ij} = \frac{\sum_{(p,q)\in N_{ij}} S_{pq} P_{pqij} + X_{ij}}{M + \sum_{(p,q)\in N_{ij}} P_{pqij}} \qquad (4)$$