$m=2$

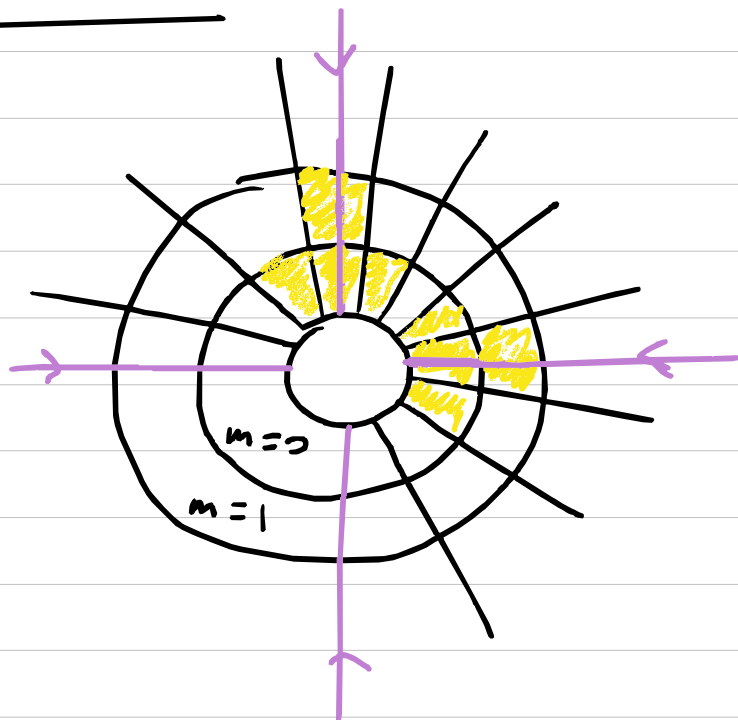$m=1$

Terminology: "March Meeting code" is the code that was used to generate results for March Meeting. Here the mass from microtubules is exchanged with the diffusive layer only on rays "directly underneath it", i.e. on rays with the same angles.

In contrast, what we attempted to do since the March Meeting (and so far failed) is a "rectangular code", where the mass from a microtubule exchanges with the diffusive layer with a certain distance d.

Here I propose a smaller step away from the March Meeting code. This "Mixed code" will work exactly like the March Meeting code, except for $m=0$ ring (the one immediately surrounding the central patch). On the $m=0$ ring, a microtubule will exchange the mass with rays not only directly "underneath" it, but also two other patches immediately surrounding it (see yellow patches).

Update rules for ρ and ϕ for $m = 0$
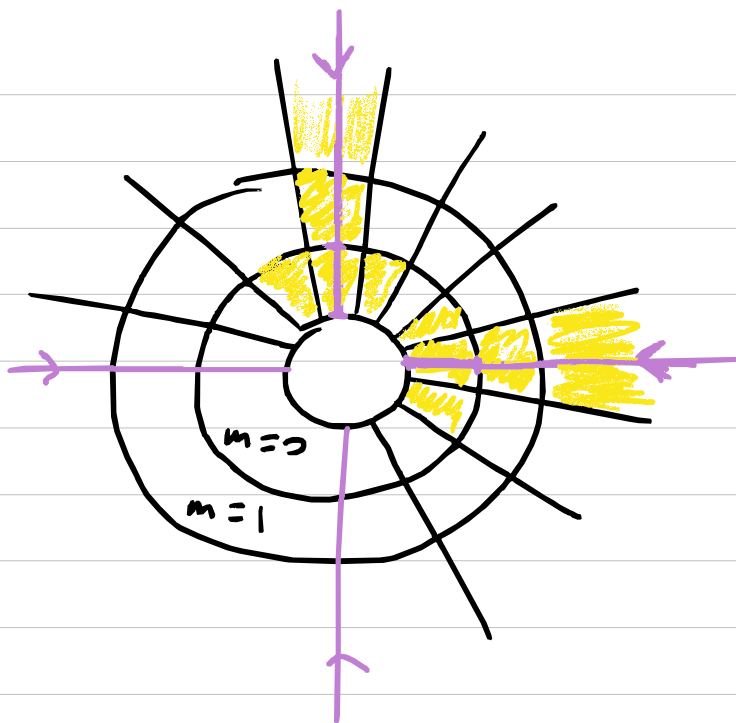
I will call these $\rho_{0,n}$ and $\phi_{0,n}$, but <u>don't</u> confuse the subscript 0 with the central patch.

← time step

- $\rho_0(h+1) = \rho_0(h) - \left(\dfrac{j_R - j_L}{\Delta r}\right)\Delta t$

  $+ \; a\,\Delta r\,\Delta\theta\,\Delta t\,\left\{\phi_{\theta n}(h) + \phi_{0,n-1}(h) + \phi_{0,n+1}(h)\right\}$

  $- \; b\,\rho_0(h)\,\Delta t$

  this section of the microtubule receives mass from <u>three</u> DL patches

- $\phi_{\theta n}(h+1) = \phi_{0,n}(h) - \dfrac{\Delta t}{\Delta r}\left[2J_R^{\,h} - J_L^{\,r}\right]$

  $- \; \dfrac{\Delta t}{\Delta r\,\Delta\theta}\left[J_e^{\,\theta} - J_L^{\,\theta}\right]$

  $- \; a\,\phi_{\theta n}(h)\,\Delta t \;\; + \;\; \dfrac{b}{3}\;\dfrac{\rho_0(h)\,\Delta t}{\Delta r\,\Delta\theta}$

  $\big\}$

  only $\frac{1}{3}$ of the mass lost by the segment **1** of the microtubule goes to each of the three yellow patches on the $m=0$ ring

Everything else in the code would be exactly the same as in the March Meeting code. We are only modifying the way in which mass is exchanged between a sector of a microtubule and neighboring patches on the DL.

Therefore, it is best to handle these $m=0$ changes with ".if" statements, rather than writing loops, etc. This way the changes are transparent, and we can always turn them off easily to track where errors happen (ex: if mass isn't conserved again).