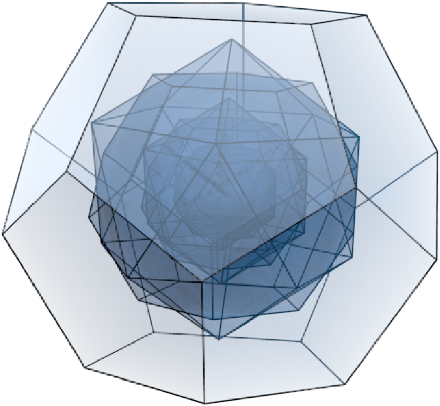
The discretization

- The icosahedron couples to its dual dodecahedron (i.e. $k^d = k \Rightarrow k^i = \sqrt{\varphi \frac{\sqrt{5}}{3} k}$). Where $\varphi = \left(1+\sqrt{5}\right)/2$ is the golden ratio
- The triad condition $\mathbf{k}+\mathbf{p}+\mathbf{q}=0$, can now be satisfied with:

$$k_n \hat{\mathbf{k}}^i_\ell + k_{n-1} \hat{\mathbf{k}}^d_{\ell'} + k_{n+1} \hat{\mathbf{k}}^d_{\ell''} = 0$$
$$k_n \hat{\mathbf{k}}^d_\ell + k_{n-1} \hat{\mathbf{k}}^i_{\ell'} + k_{n+1} \hat{\mathbf{k}}^i_{\ell''} = 0$$



What we solve?

- At each node (i.e. vertex ℓ of shell n), we need to solve, the Navier-Stokes equation in spectral form:

$$\partial_t u^i_{n,\ell} + i k^\kappa_{n\ell} \left[\delta_{ij} - \frac{k^i_{n\ell} k^j_{n\ell}}{k_n^2} \right] \sum_{n',\ell'} u^{\kappa *}_{n'\ell'} u^{j*}_{n''\ell''} = 0$$

- We can "flatten" using $m = \text{floor}\,(n/2) \times 32 + (n \mod 2) \times N_{fs} + \ell$ (and then $m \to n$), where N_{fs} is the number of vertices of the first shell.
- This gives a network model, where each "node" is connected to a "pair".