Graphical Recap:
- Threading
- Pipeline
- Model-based Threshold
- K-means (diff from EM)
- Edge linking
- Depth transform
- Region-based segm.
- Energy minimization

Energy:
\[ E = E_{\text{Image}} + E_{\text{Internal}} \]
\[ E_{\text{Image}} = \int \frac{\partial E(p)}{\partial c} + \beta(c) \frac{\partial c}{\partial c} \]

Choose an initial guess coating.

Uniformly sample it \( v(p) \):

\[ E_{\text{image}} = -\left| \sum \frac{\partial H(c(p))}{\partial c} \right|^2 + \int \frac{\beta(p)}{1 + \left| \sum \frac{\partial H(c(p))}{\partial c} \right|^2} \]

Energy functional:

\[ E_{\text{Int}} = \int \beta(c) \left( \frac{\partial c}{\partial p} \right)^2 + \beta(c) \left( \frac{\partial c}{\partial p} \right)^2 \]

\[ \frac{\partial}{\partial c} - \frac{\partial}{\partial p} \frac{\partial c}{\partial p} + \frac{\partial}{\partial p} \frac{\partial c}{\partial p} \]
All applying thus.

\[ \nabla E = D_{0} \frac{\partial \nabla E}{\partial p} - 2 \frac{\partial \left[ 2 \Psi(p) C_{p} \right]}{\partial p} + 3 \frac{\partial \left[ B(p) C_{p} \right]}{\partial p} = 0 \]

Min. by gradient descent.

\[ \frac{\partial C}{\partial t} = -\nabla E. \]

\[ C(t) = C^{0} - t \cdot \nabla E. \quad \text{converges to local minimum.} \]

Written as a PDE.

If \( t \to \infty \) enough

Not geometric in parameter varies with the curve.

Arc length param.: \( \gamma C(s) \) so that

\[ 0 \to L. \]

Also \( \| C \| dp. \)

\[ \frac{dC}{ds} = \frac{dC}{dp} \frac{dp}{ds} \]

\[ \text{then, } \frac{dC}{ds} = \| eC \| \frac{dp}{ds}. \]

\[ ds = \| C \| dp. \]