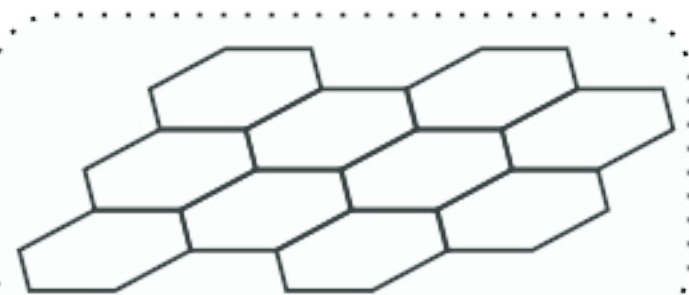


Assumed material properties

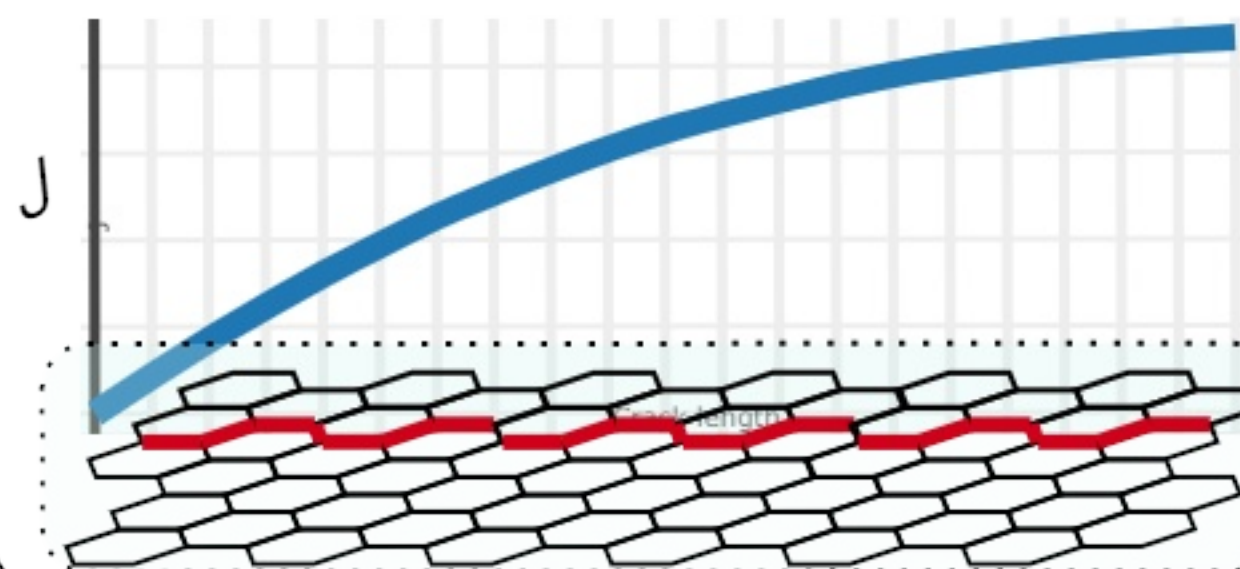
$$\Phi = \frac{\sigma_e^2}{\bar{\sigma}^2} + 2q_1 f^* \cosh\left(\frac{3q_2 \sigma_h}{2\bar{\sigma}}\right) - 1 - (q_1 f^*)^2$$

$\sigma(\epsilon, \epsilon', T)$

Synthetic microstructure

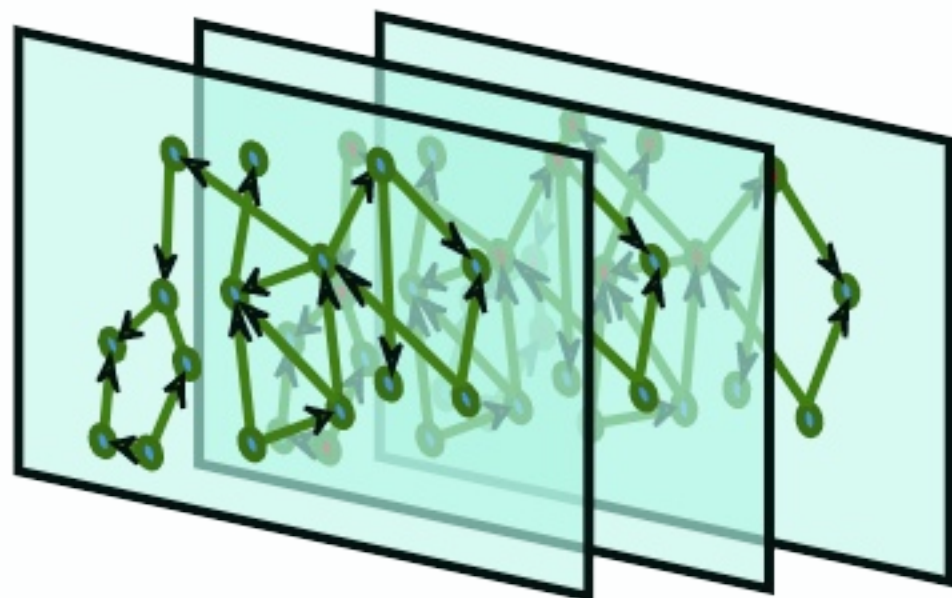


Graph search algorithm



Designed microstructure

Graph Neural Network



Symbolic regression

$$dJ = f(dr, \theta)$$

Experimental data

