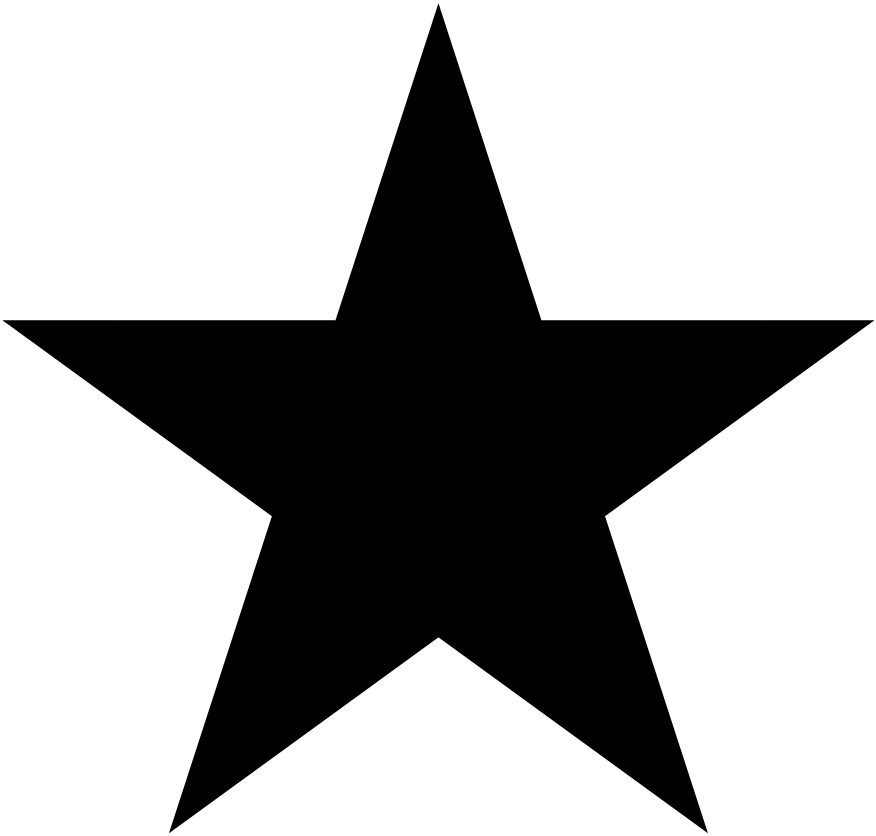
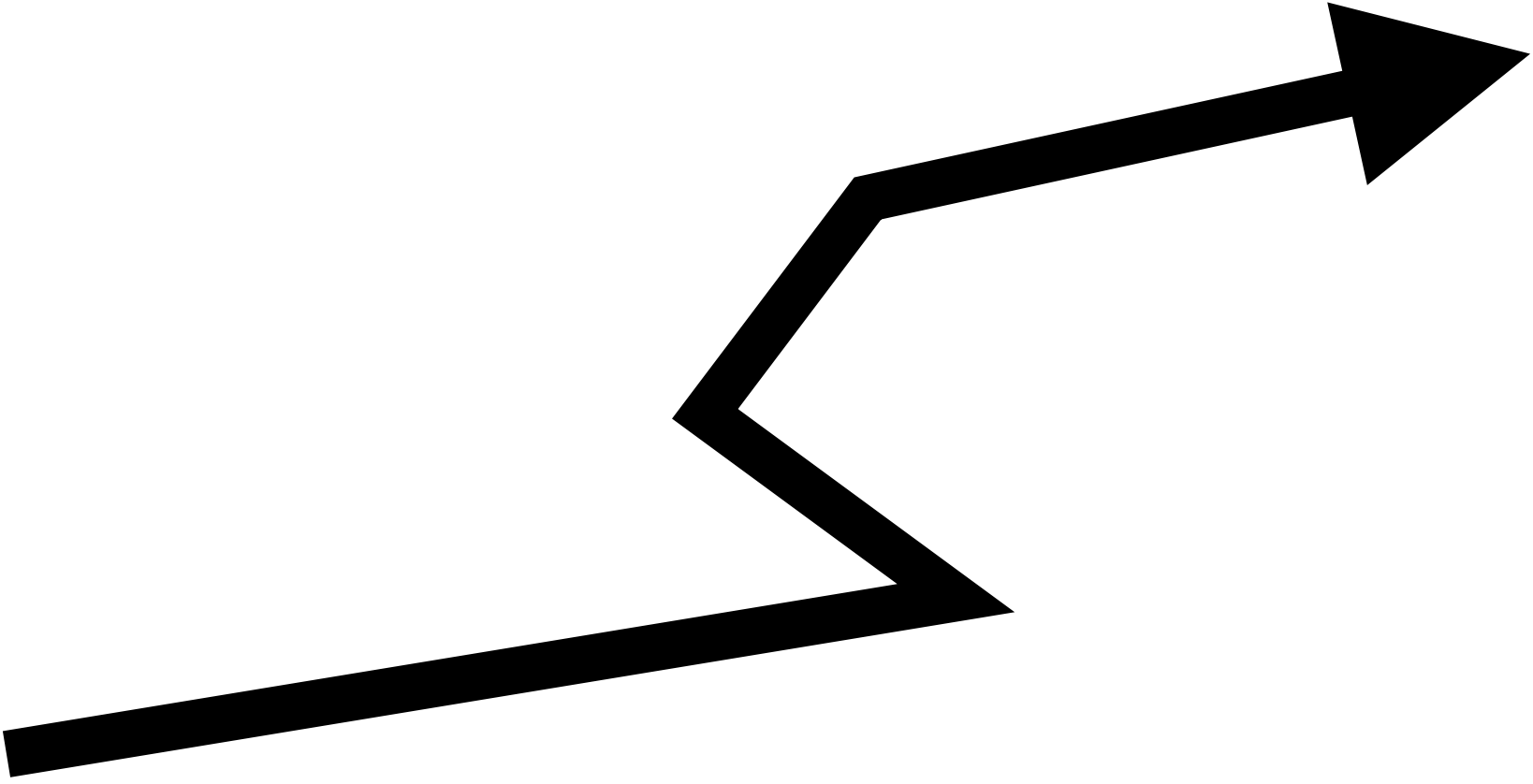
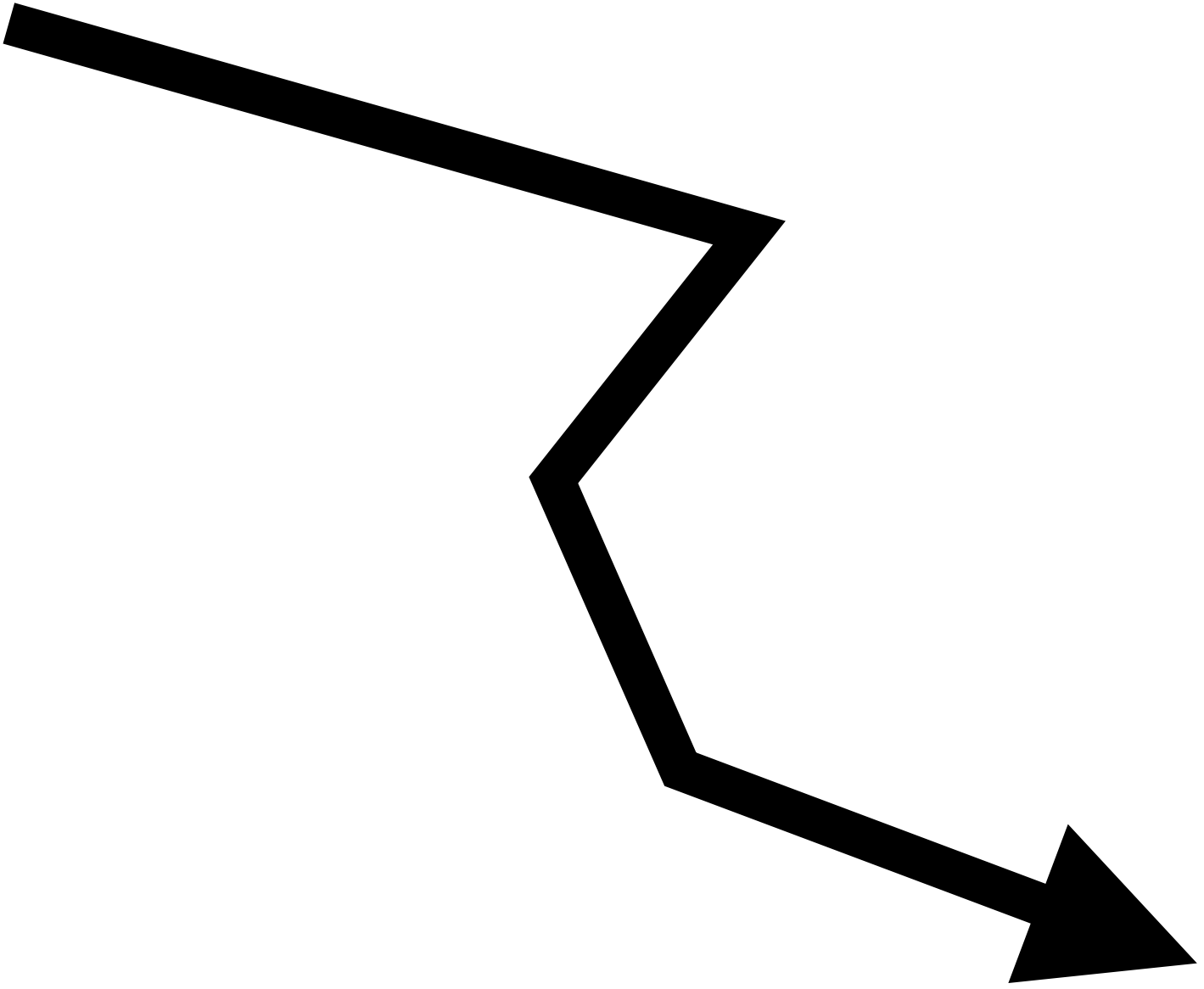
DCWM: Decision-time Planning

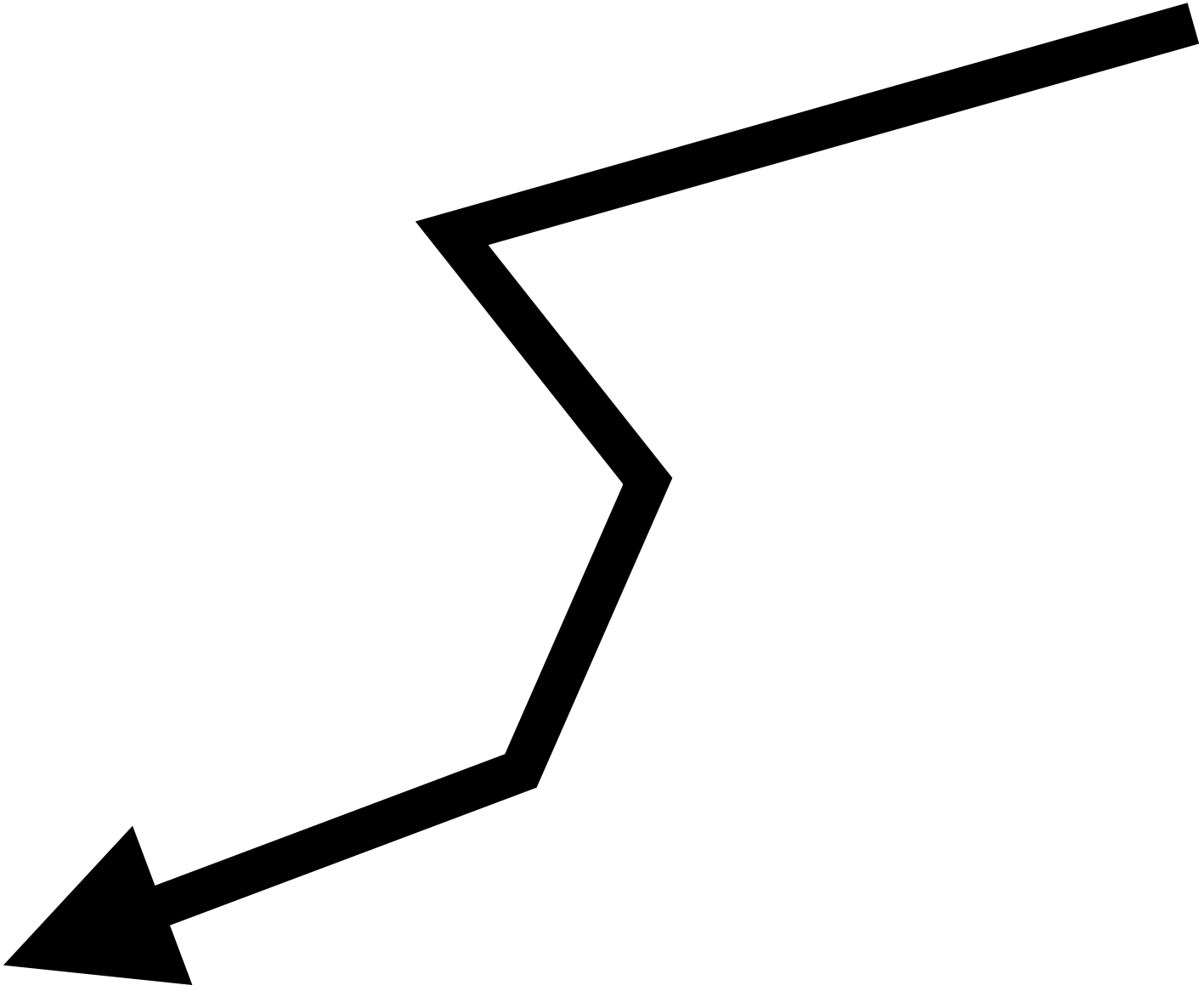
Model Predictive Path Integral Control (MPPI)

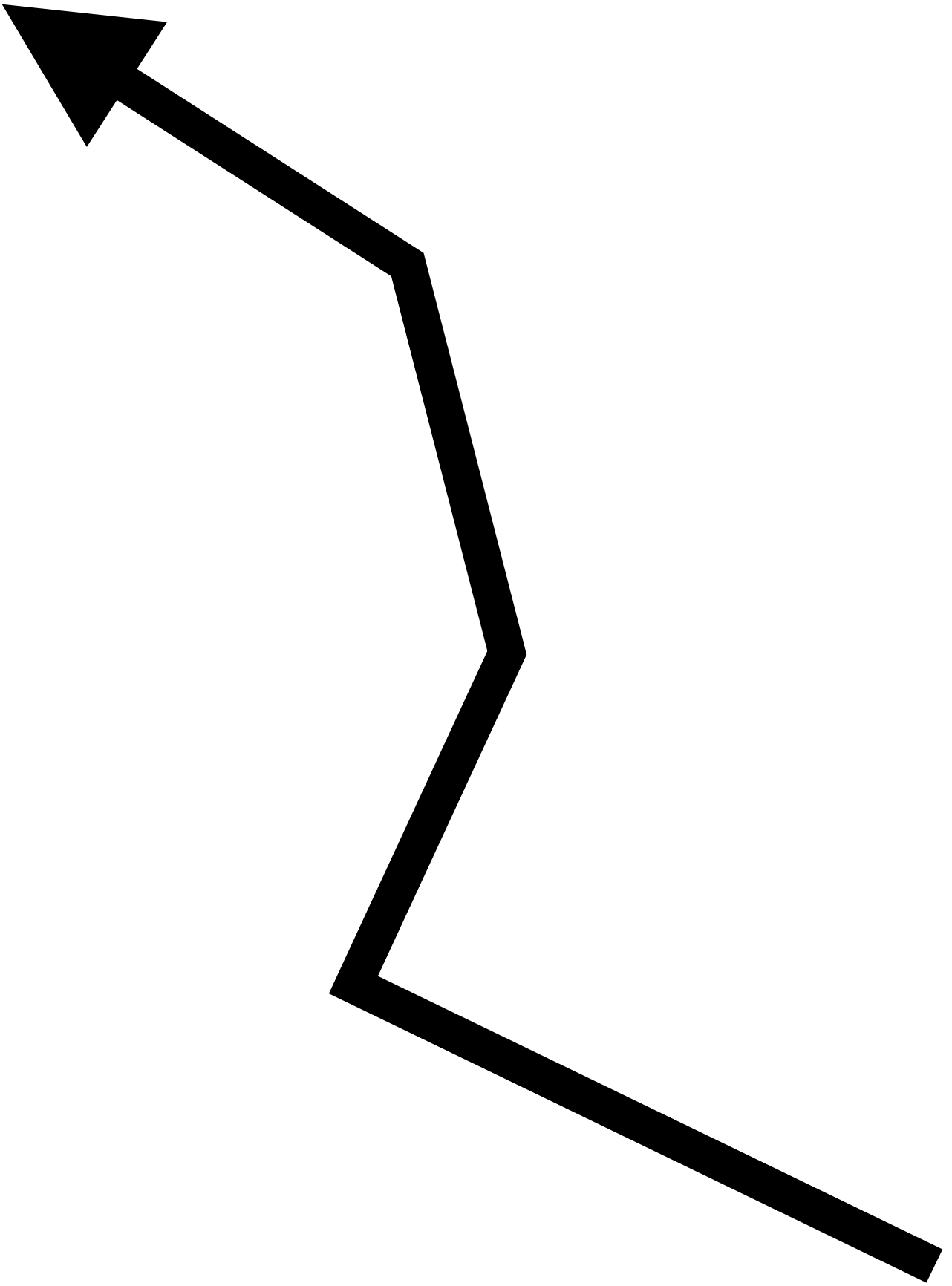
21

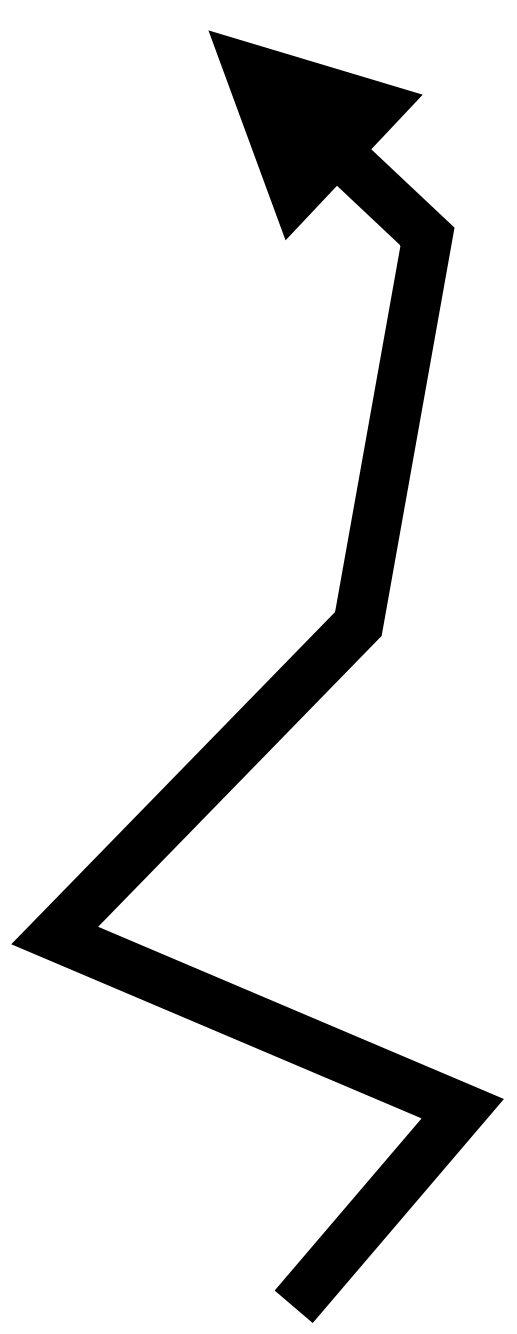


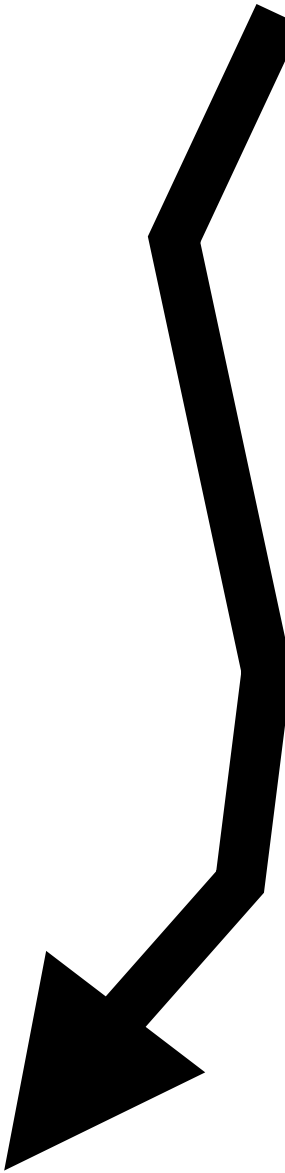


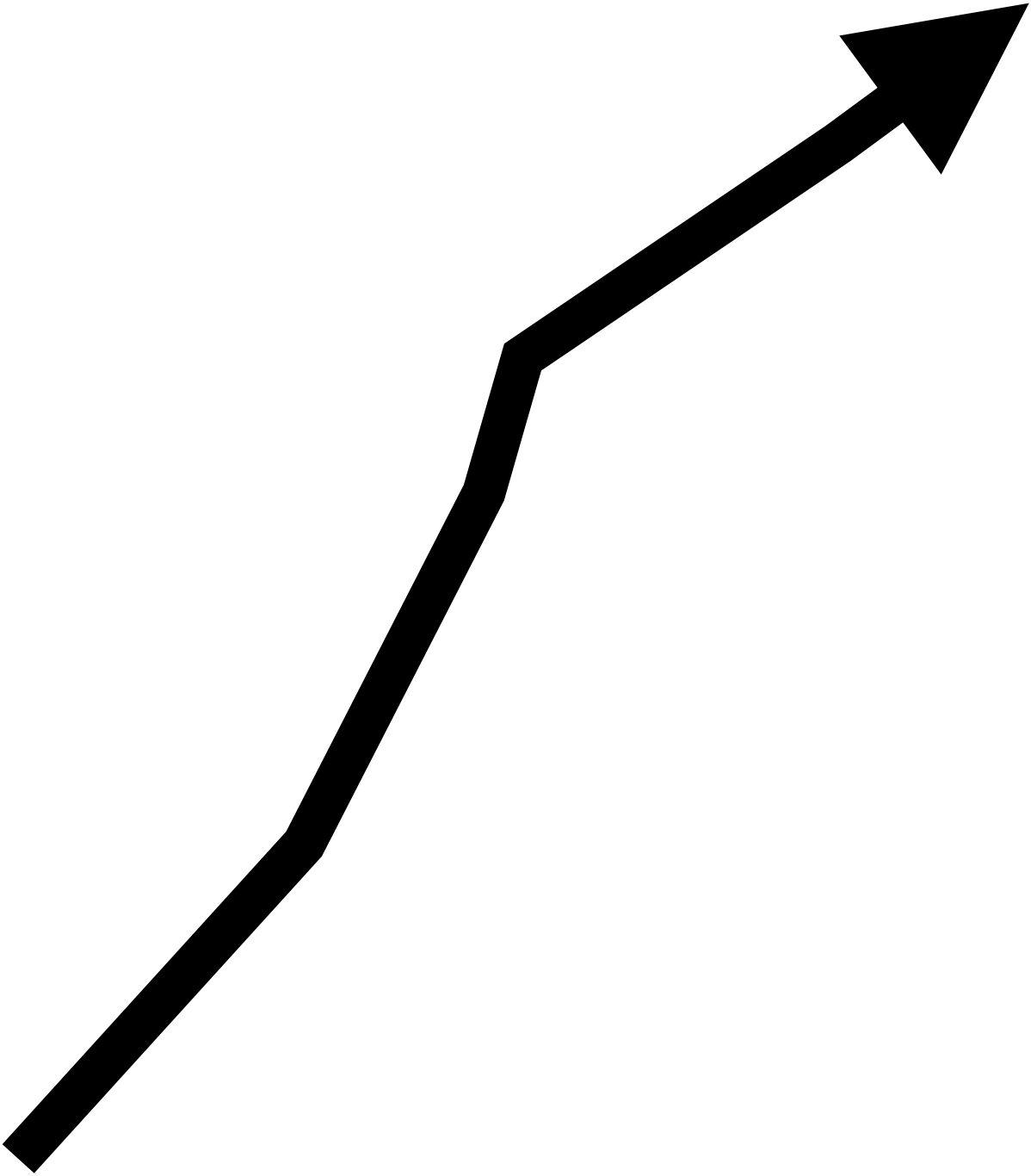




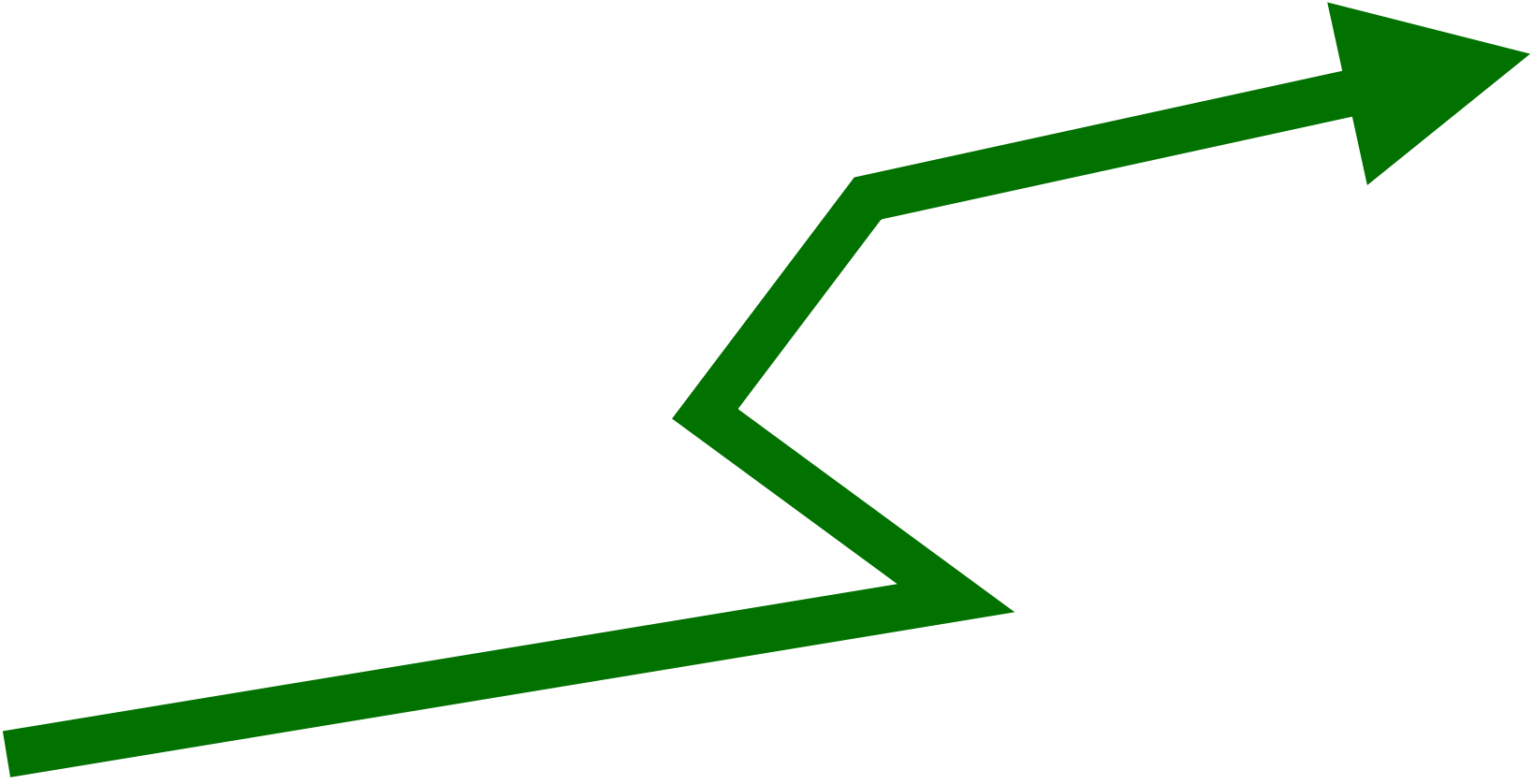


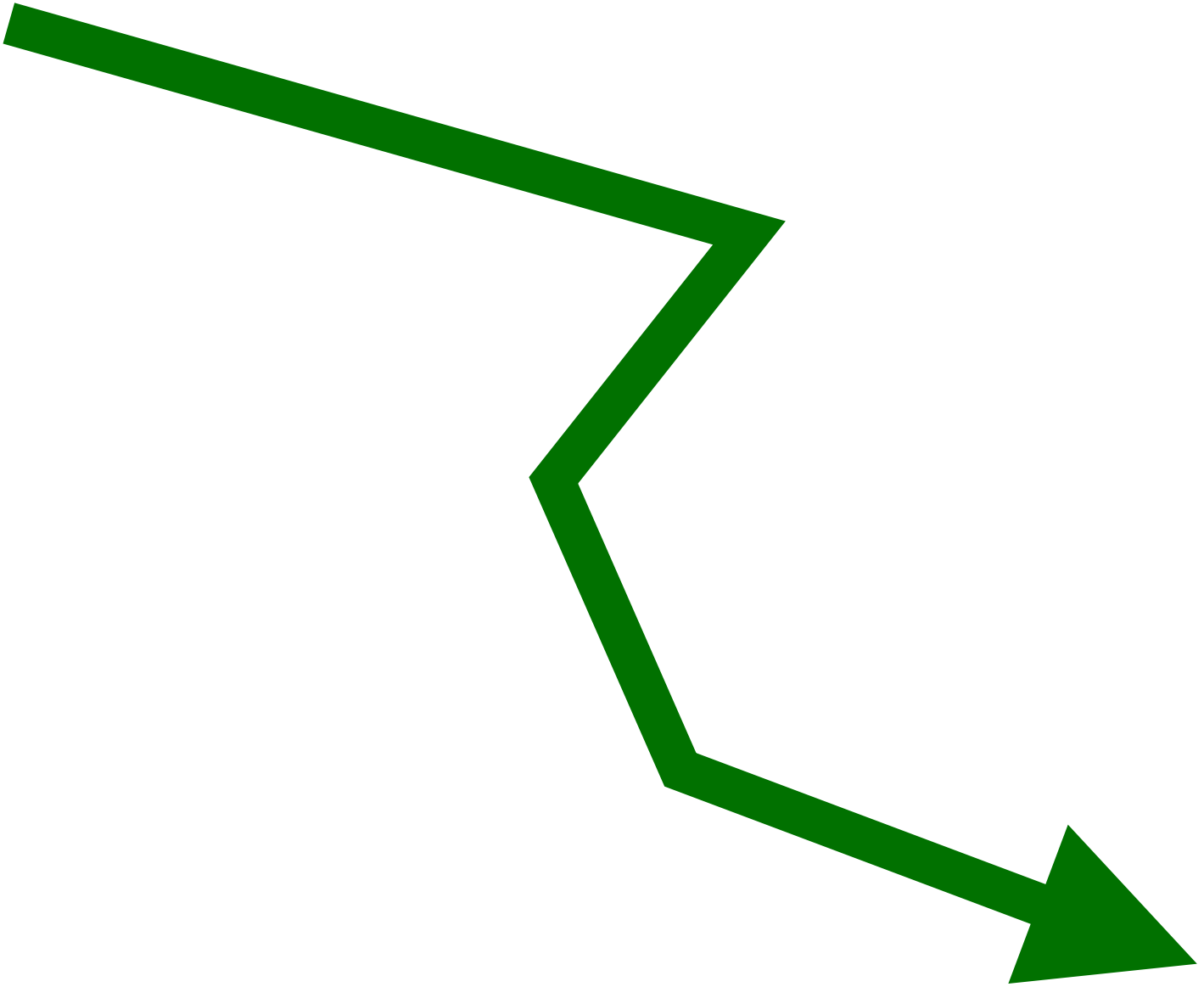


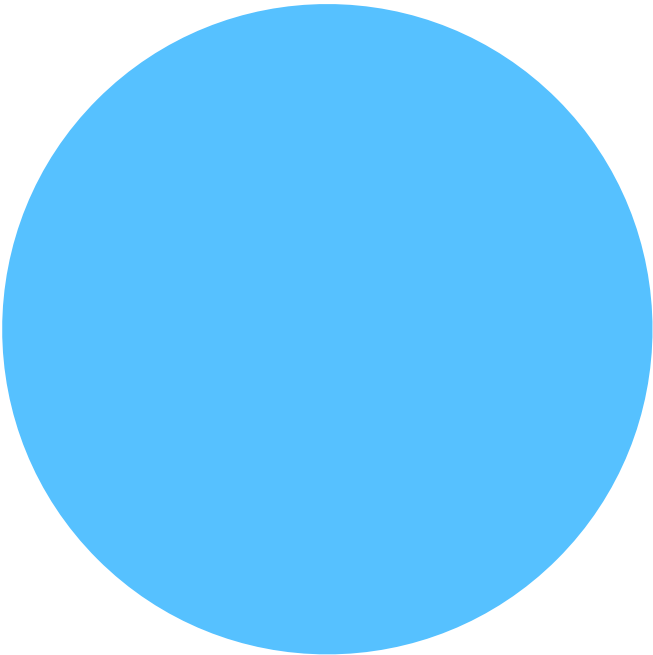




top-K







Iteration 1

Initialise action sampling distribution $\{a_t \sim \mathcal{N}(\mu_t, \sigma_t^2)\}_{t=0}^{H}$

For each iteration

Sample N action sequences $\{a^i_{0:H}\}_{i=1}^N$

Evaluate objective $J(\mathbf{a}^i_{0:H}, \mathbf{s})$ for each sample

Select top K performing samples

Update action distribution parameters $\{\mu_t, \sigma_t^2\}_{t=0}^{H}$

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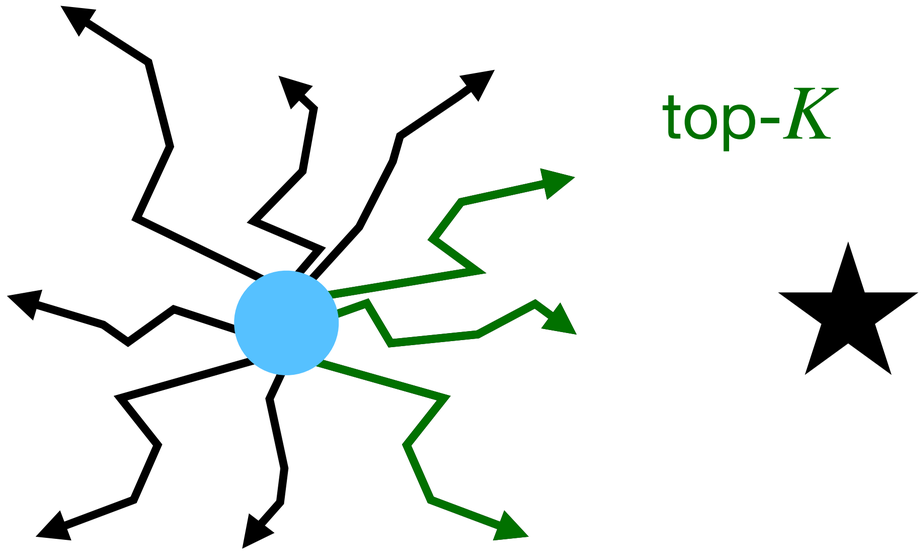

Initialise action sampling distribution $\{a_t \sim \mathcal{N}(\mu_t, \sigma_t^2)\}_{t=0}^{H}$

For each iteration

Sample N action sequences $\{a_{0:H}^i\}_{i=1}^{N}$

Evaluate objective $J(\mathbf{a}_{0:H}^i, \mathbf{s})$ for each sample

Select top K performing samples

Update action distribution parameters $\{\mu_t, \sigma_t^2\}_{t=0}^{H}$

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Model Predictive Path Integral Control (MPPI)

Iteration 2

Initialise action sampling distribution $\{a_t \sim \mathcal{N}(\mu_t, \sigma_t^2)\}_{t=0}^{H}$

For each iteration

Sample N action sequences $\{a_{0:H}^i\}_{i=1}^{N}$

Evaluate objective $J(\mathbf{a}_{0:H}^i, \mathbf{s})$ for each sample

Select top K performing samples

Update action distribution parameters $\{\mu_t, \sigma_t^2\}_{t=0}^{H}$