https://en.wikipedia.org/wiki/Bernoulli_distribution

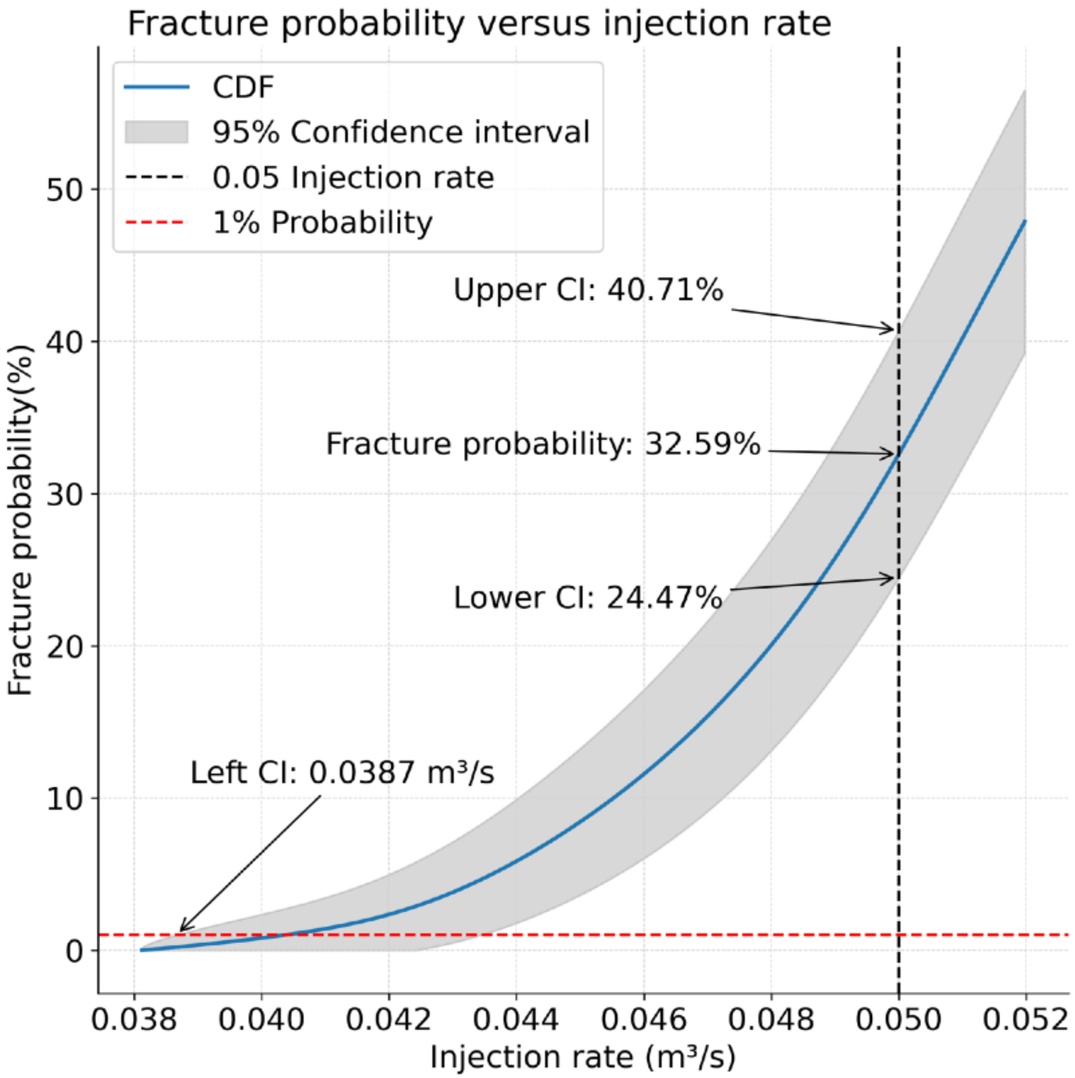
Control benefit

Given the *fracture probability*, DT allows us to choose *injection rate* with a certain *confidence interval* —e.g.,

- 97.5% confidence (left-CI)
- $q_3 = 0.0387\mathrm{m}^3/\mathrm{s}$
- fracture probability $< 1\,\%$

For the manually chosen injection rate $q_3 = 0.05m^3/s$,

- MLE of fracture probability $\mathrm{CDF}(q_3) = 32.59\,\%$
- we have 95% confidence that fracture probability is within 24.47 – 40.71%

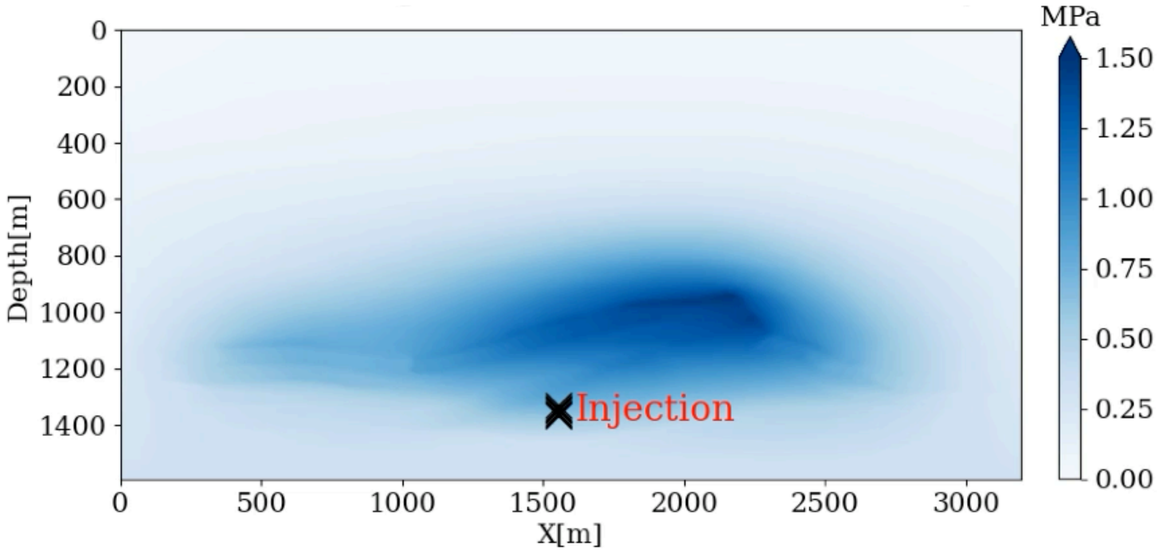


q_3

Optimized

w/o vs. w/ *pressure* control

$\mathbf{x}_4 \sim p(\mathbf{x}_4 \,|\, \bar{\mathbf{y}}_4^o)[\prime\delta p\prime]$ *for* $q = 0.0500\mathrm{m}^3/\mathrm{s}$



$\mathbf{x}_4 \sim p(\mathbf{x}_4 \,|\, \bar{\mathbf{y}}_4^o)[\prime\delta p\prime]$ *for* $q = 0.0387\mathrm{m}^3/\mathrm{s}$