likelihood = prob. data given model

http://phylogeny.uconn.edu/normalsnap/

After playing with the app...

Can you increase lnL over the "snap-to" value?

Is the average height of the points related to lnL?

Why does it report the natural logarithm of the likelihood (lnL) and not the likelihood?

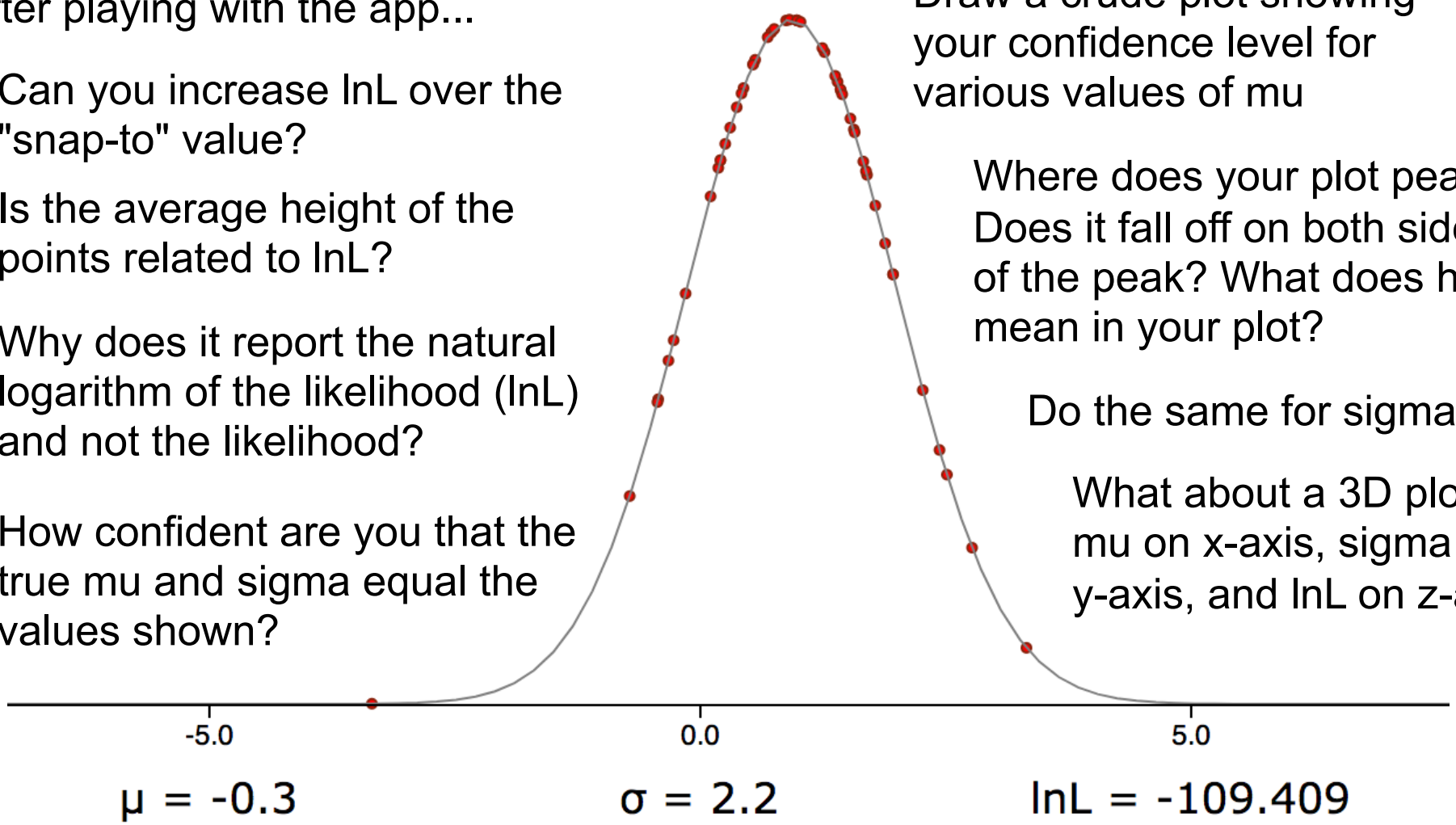
How confident are you that the true mu and sigma equal the values shown?

Draw a crude plot showing your confidence level for various values of mu

Where does your plot peak? Does it fall off on both sides of the peak? What does height mean in your plot?

Do the same for sigma.

What about a 3D plot with mu on x-axis, sigma on y-axis, and lnL on z-axis?



http://phylogeny.uconn.edu/mcmc-robot/
(for other versions, see mcmcrobot.org)

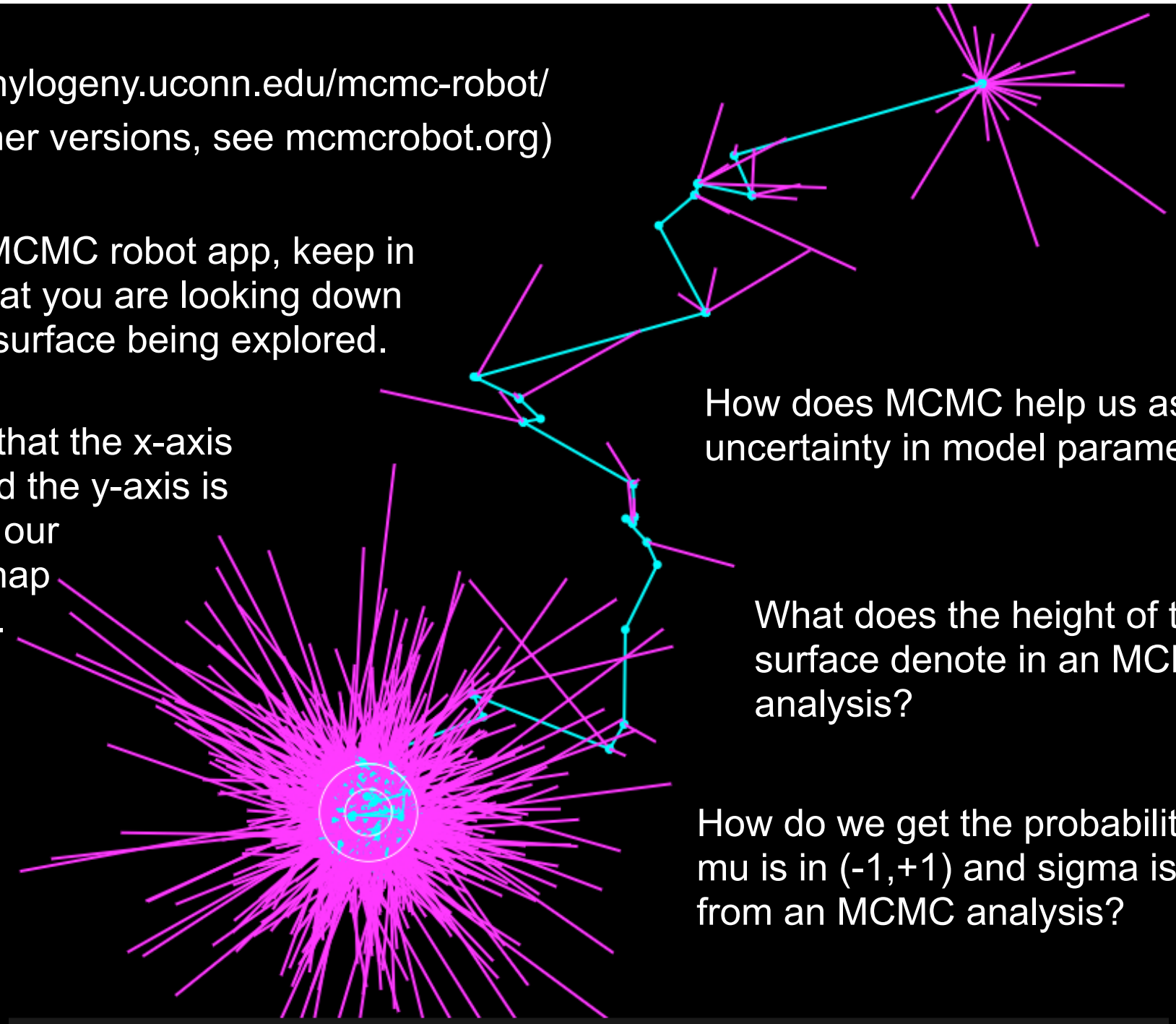
In the MCMC robot app, keep in mind that you are looking down on the surface being explored.

Pretend that the x-axis is mu and the y-axis is sigma in our normalsnap example.

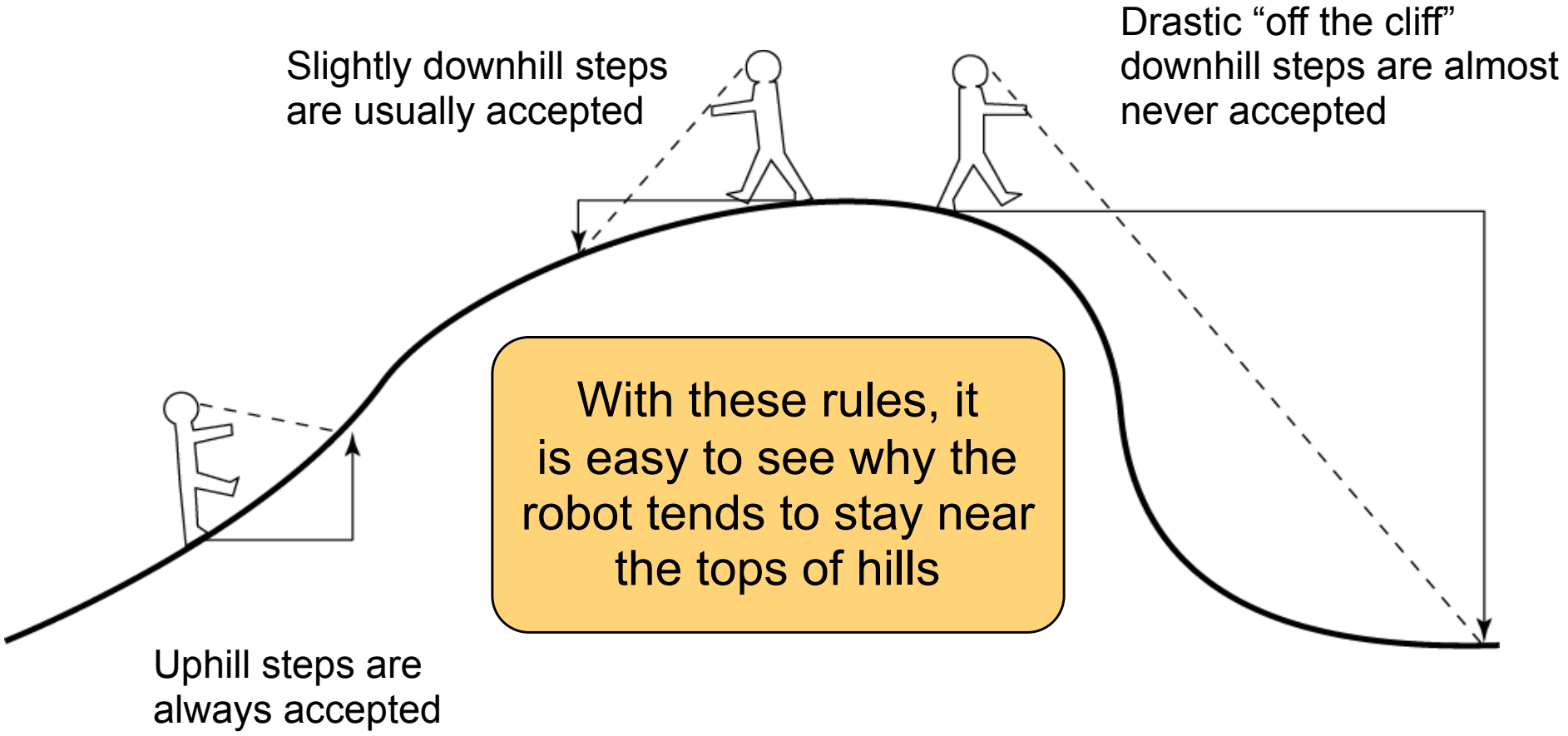
How does MCMC help us assess uncertainty in model parameters?

What does the height of the surface denote in an MCMC analysis?

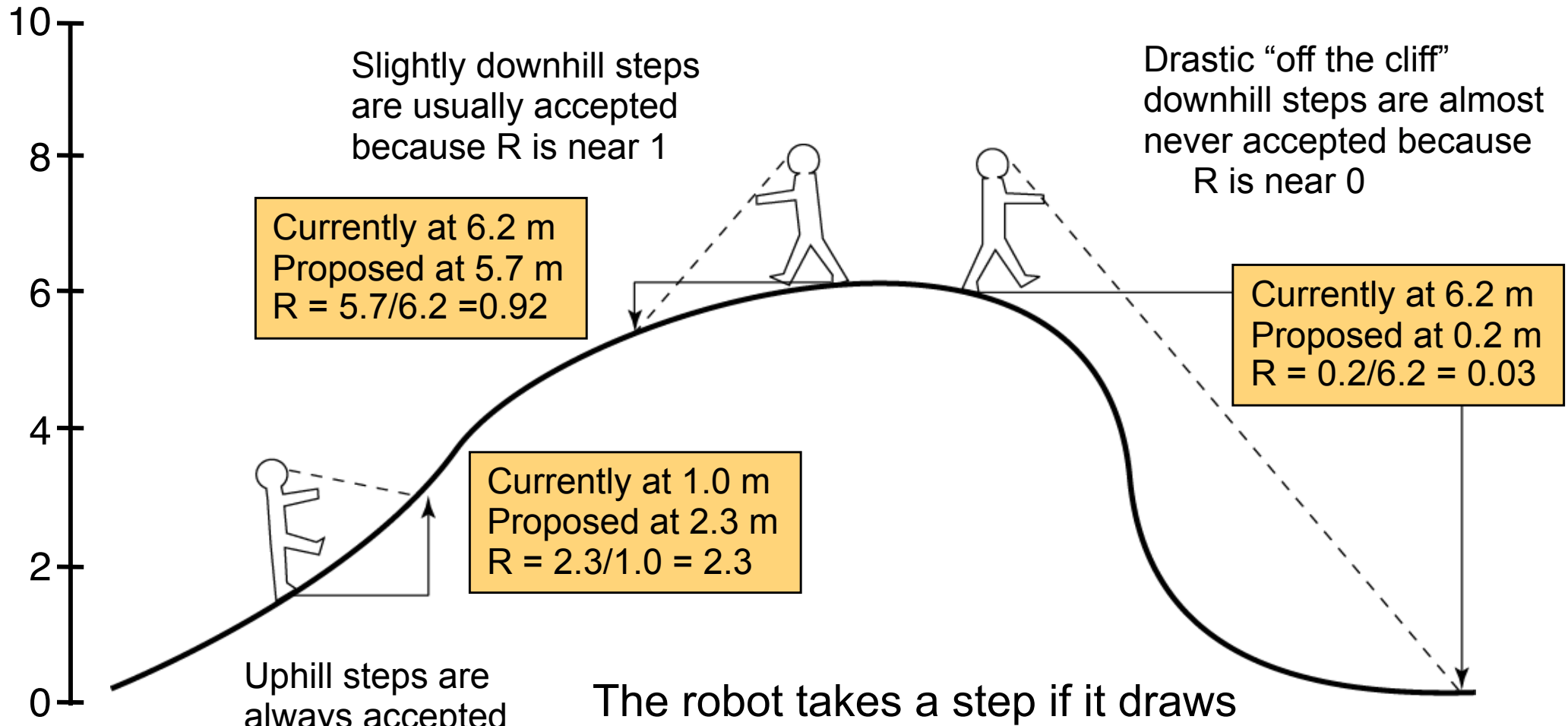
How do we get the probability that mu is in (-1,+1) and sigma is in (1,3) from an MCMC analysis?



MCMC robot's rules



(Actual) MCMC robot rules



The robot takes a step if it draws a Uniform(0,1) random deviate that is less than or equal to R

Likelihood vs. Probability

Coin flipped once	Fair coin model	Two-heads model
H	0.5	1
T	0.5	0
	1	1

Probability of the data implies function of the data (the model is fixed)

Likelihood is *always* a function of the model (data is fixed)

Say "likelihood of the *model*" and "probability of the *data*"