What have we modeled?

Is it unstable?
e.g. processor sharing when ρ>1
If the system is unstable then it's useless to take measurements; we need to think about control systems to keep it stable.

Is it bistable?
e.g. dynamic alternative routing. Then there is unpredictable flapping, and the network can be hard to manage.

What are the parameters that matter?
e.g. for TCP, we decided that the relevant parameter is *wnd=RTT C/N*. This saves us from having to explore all three parameters separately.

What parameters should we investigate?
e.g. for what parameter values do we predict the system becomes unstable? What is the behaviour when the system is too large to simulate?

What is modelling good for?

- Hacker insight is great for some problems.
- But as we build cleverer more adaptive systems, there can be surprising emergent behaviour.
- Modeling can suggest where problems are likely to occur, and you can then check these out with more detailed models or simulation or experiment.
- Modeling can also suggest how to avoid these problems.

bistability of dynamic alternative routing

TCP works so well because it's solving a sensible optimization problem

What should we model?