University of BRISTOL

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Broken codes

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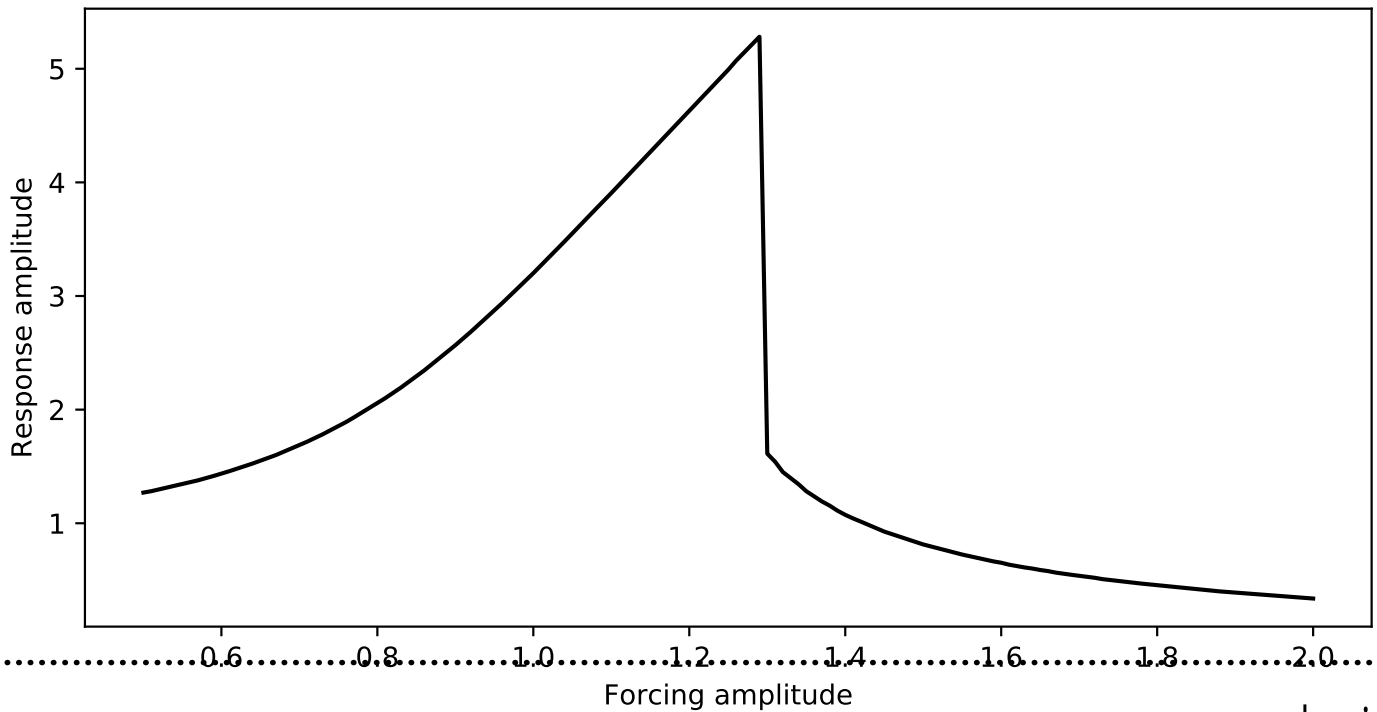
Week's work

- Redraft continuation review
- Run in-silico CBC with Fourier, splines
  - Doesn't work
  - Simplest case (Fourier, Duffing) doesn't work either

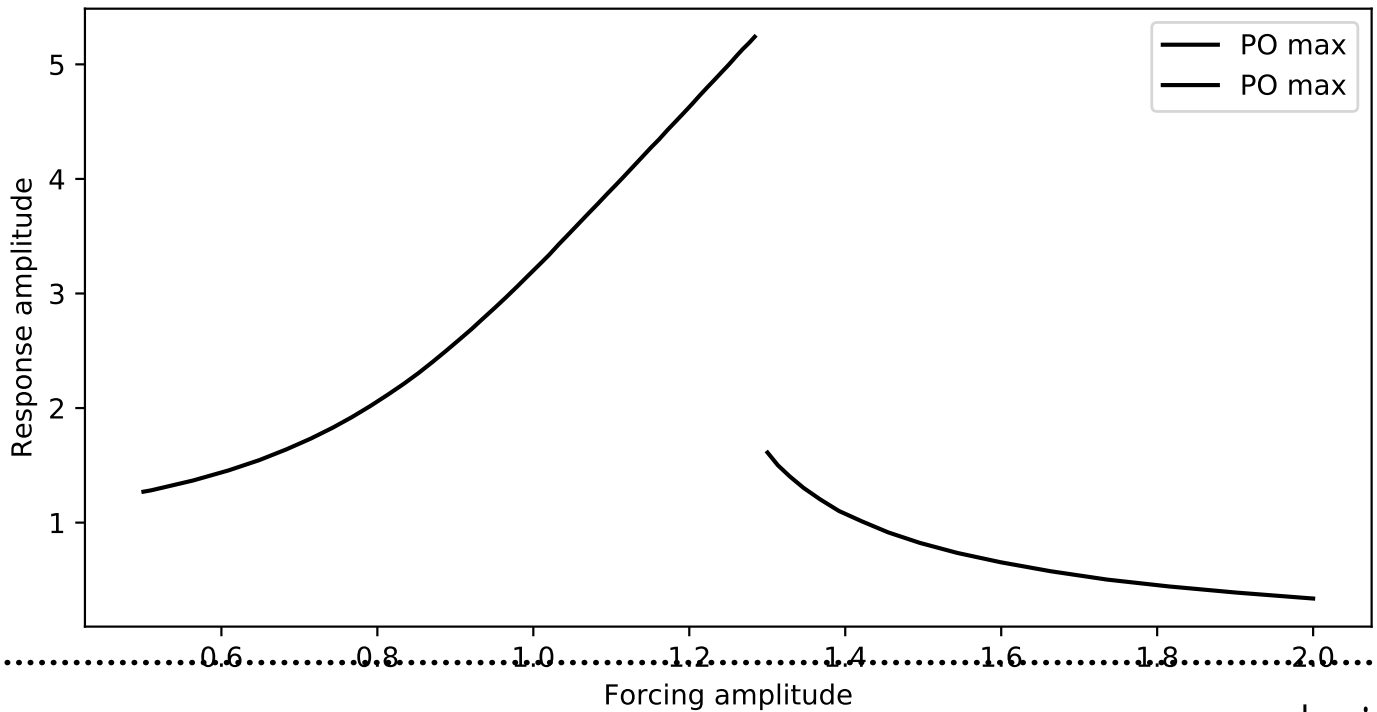
No controller, no orthogonality constraint

Code fits a discretisation to the uncontrolled system output; useful to test Newton convergence

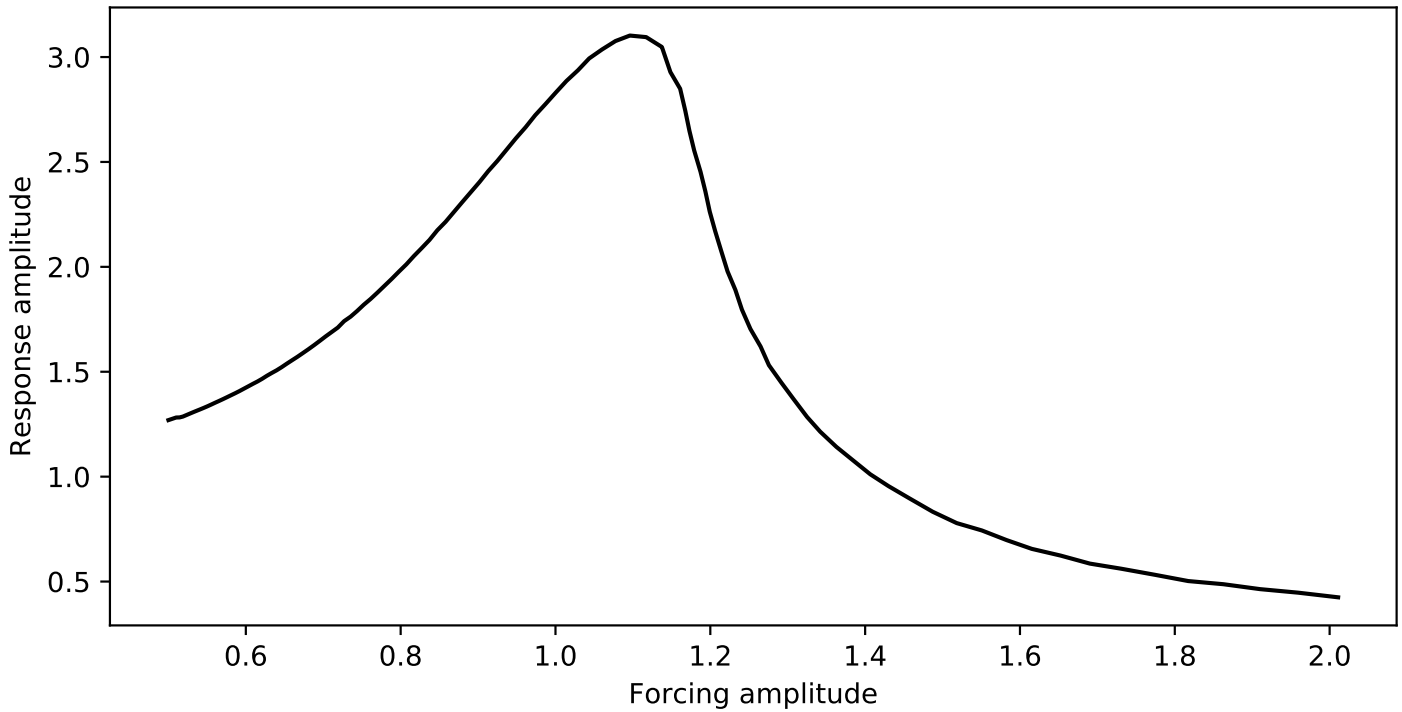


No controller, orthogonality constraint

Code fits a discretisation to the uncontrolled system output, with psuedo-arclength regularisation; fails in the expected way

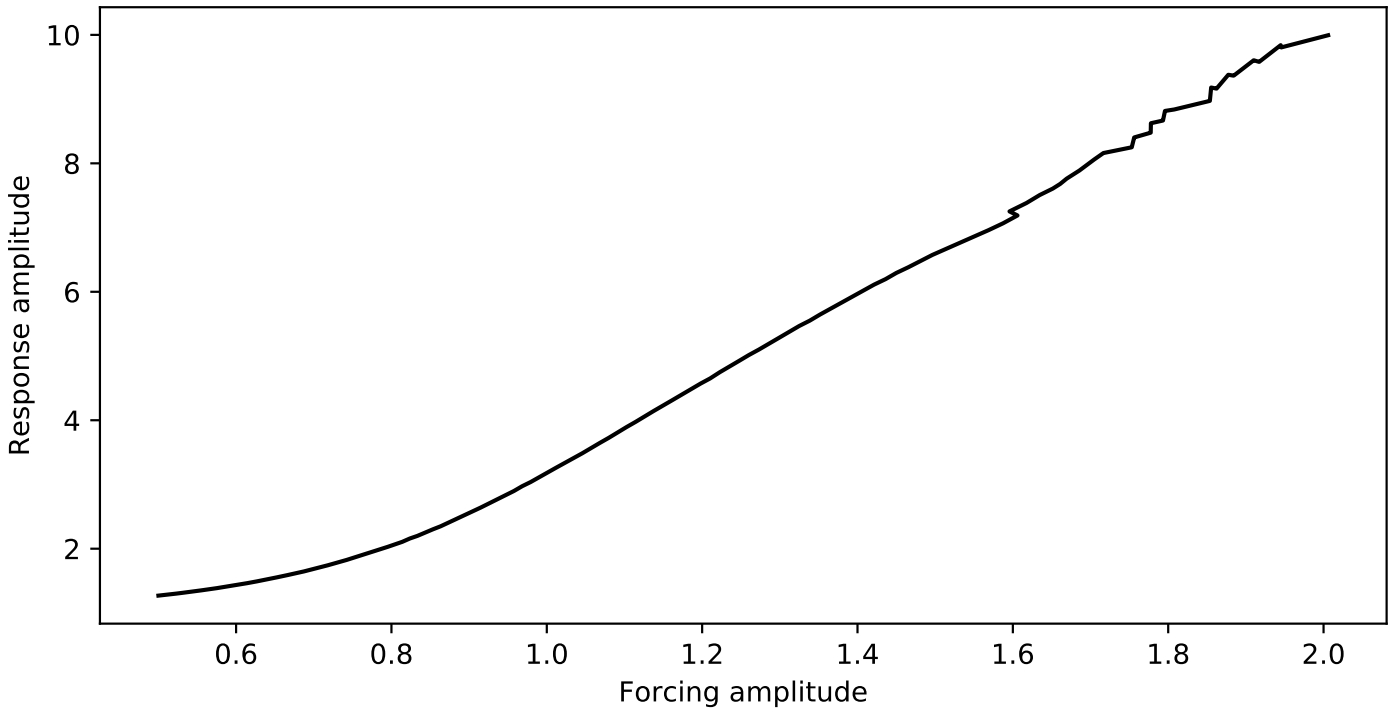


Full control-based continuation



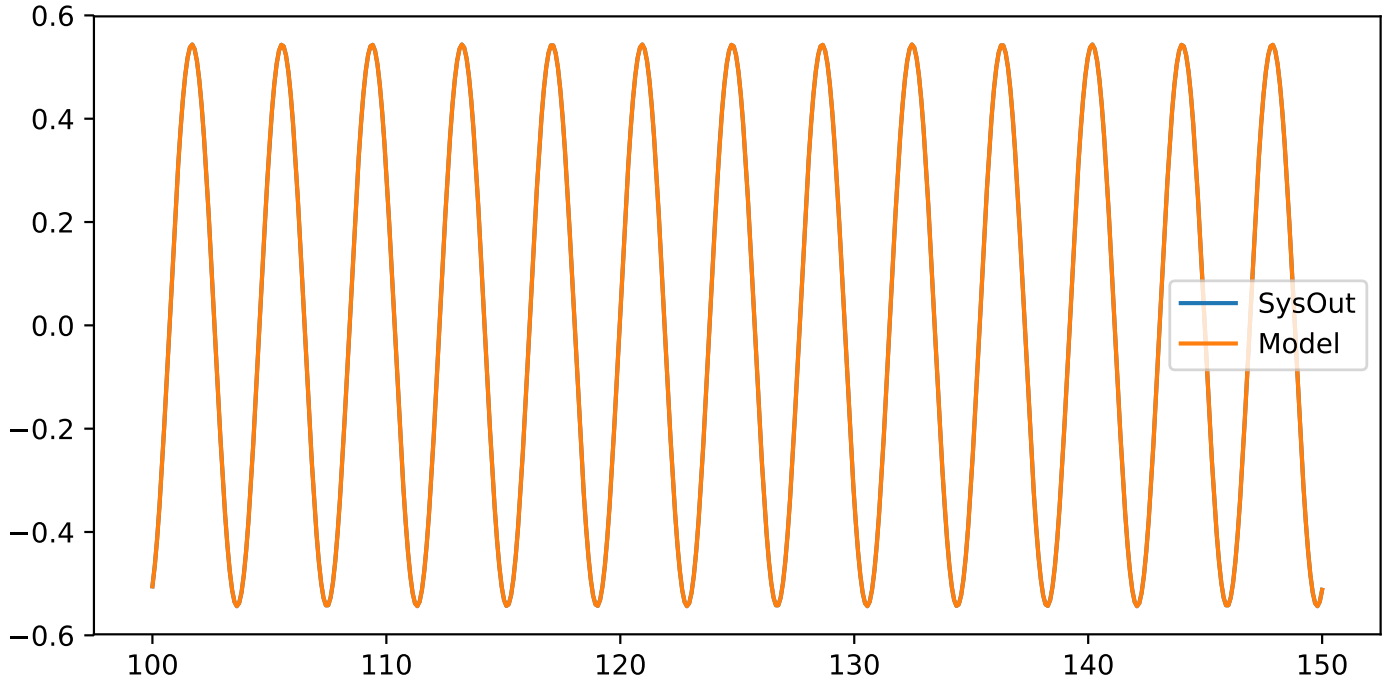
PD control. $k_p = 5,\ k_d = 1$

Full control-based continuation



P control. $k_p = 5,\ k_d = 0$

System inputs and outputs match properly



Control setup

$$\begin{cases} \dot{x} &= y \\ \dot{y} &= f(x,y) + u(t) \end{cases}$$

$$u(t) = k_p(u^*(t) - x) + k_d(u'^*(t) - y)$$

Tests

- Reduced it to simplest possible code / maths
- Checked continuation system against the literature
- Checked controlled systems work properly
- Checked discretisations match signals properly
- Tried different RHS's (Duffing, Fitzhugh Nagumo, 'weak' Fitzhugh Nagumo)
- Played with hyperparameters (control gains, step size)

Next steps

- Start writing conference paper
  - Figure out best coding approach based on that
- House moving