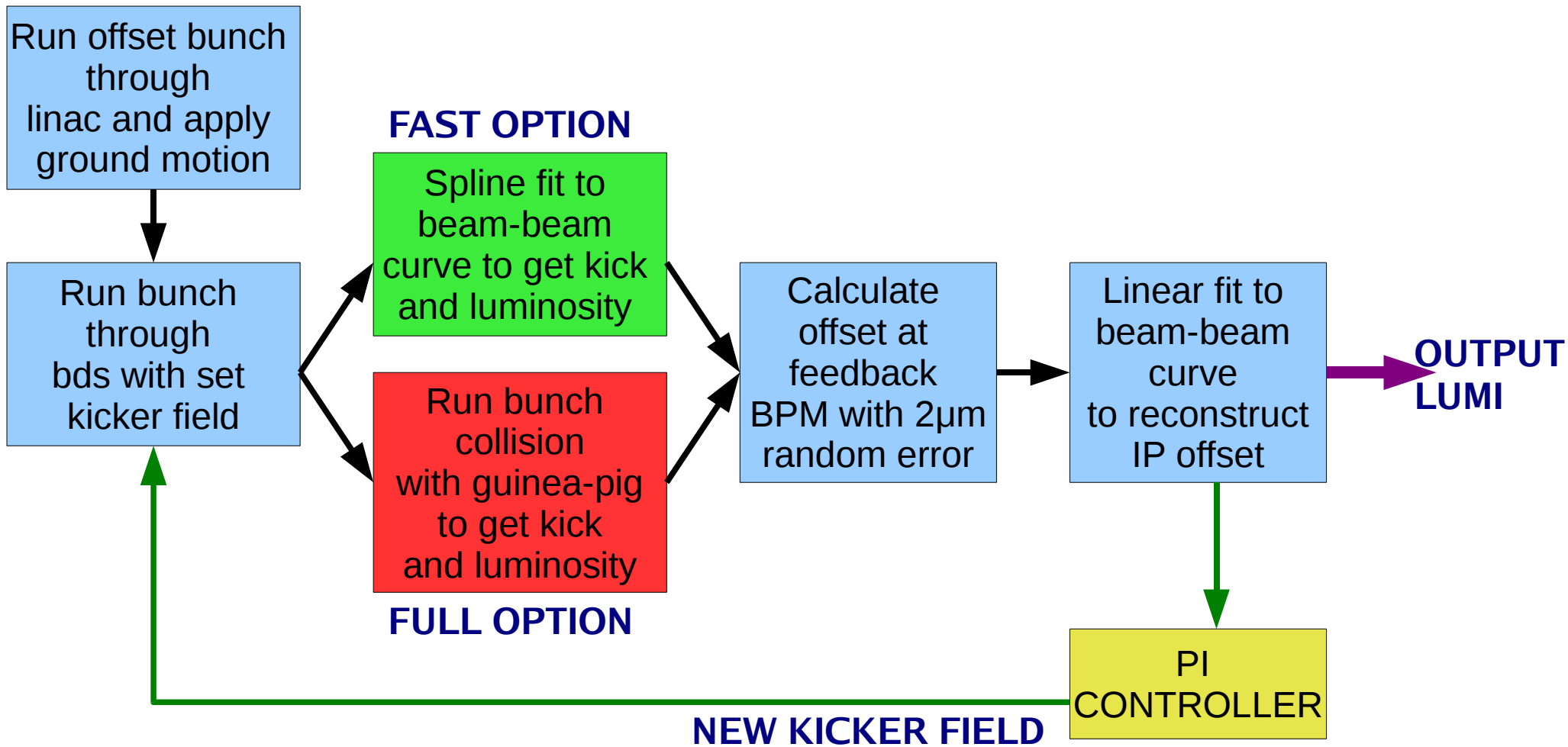


Feedback simulation changes

- Simulink model ported to Octave (only position feedback so far)
- Octave a free clone of matlab callable from within placet (and vice versa), so no licensing or distributed computing issues
- Simulation runs in “fast” and “full” modes ~ 1 bunch crossing per minute

Octave simple feedback schema



PI Controller & tuning

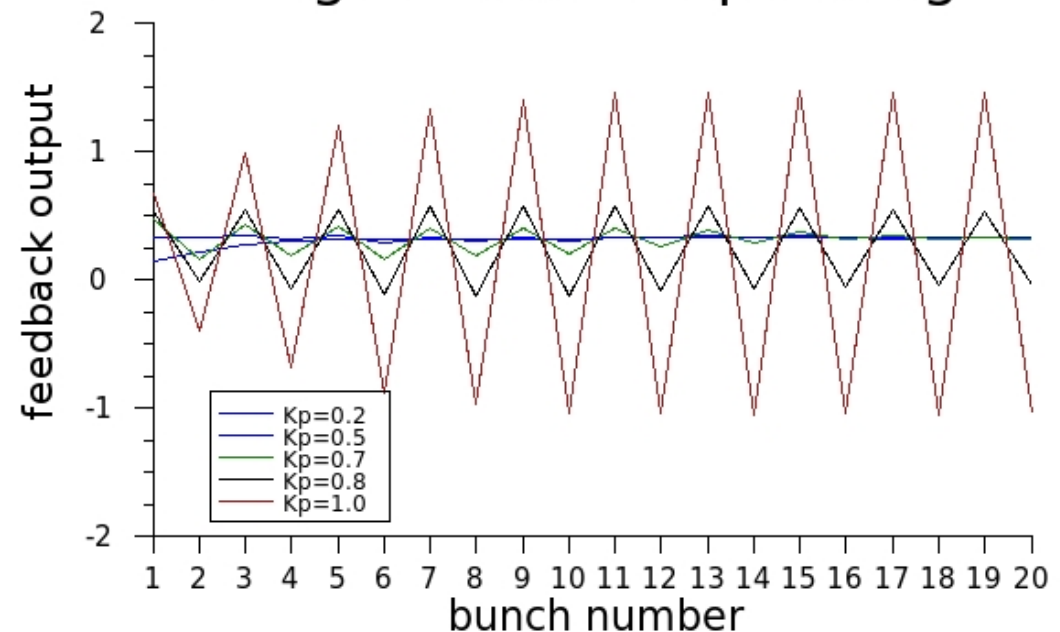
For bunch n

$$F_{\text{kick}}(n) = F_{\text{kick}}(n-1) + K_p \cdot IP_{\text{off}}(n) + (K_i - K_p) \cdot IP_{\text{off}}(n-1)$$

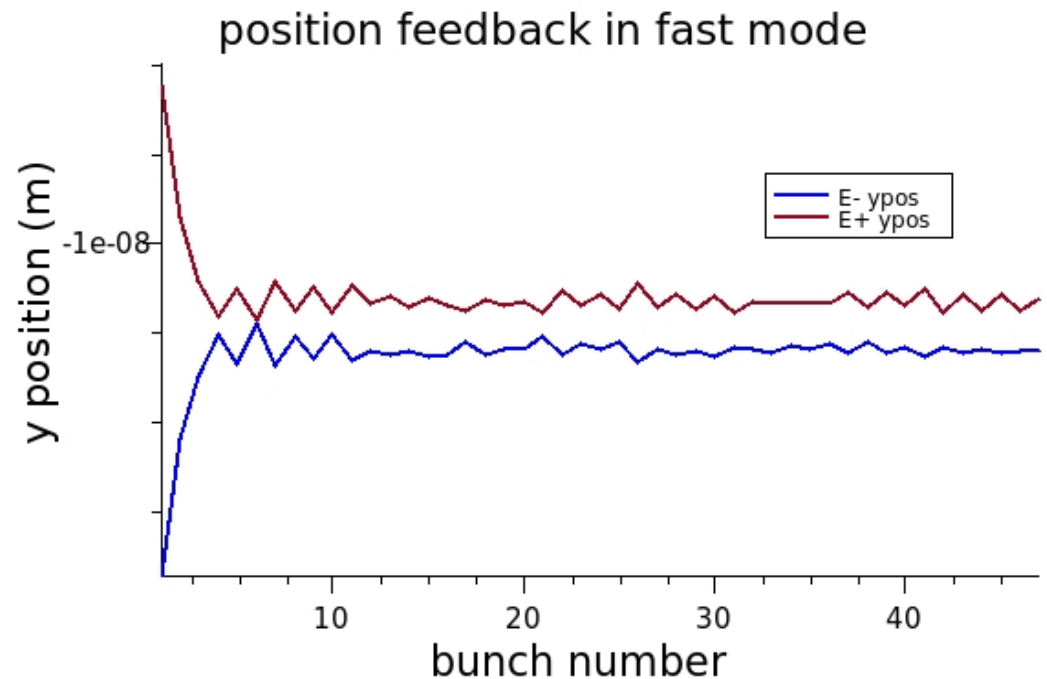
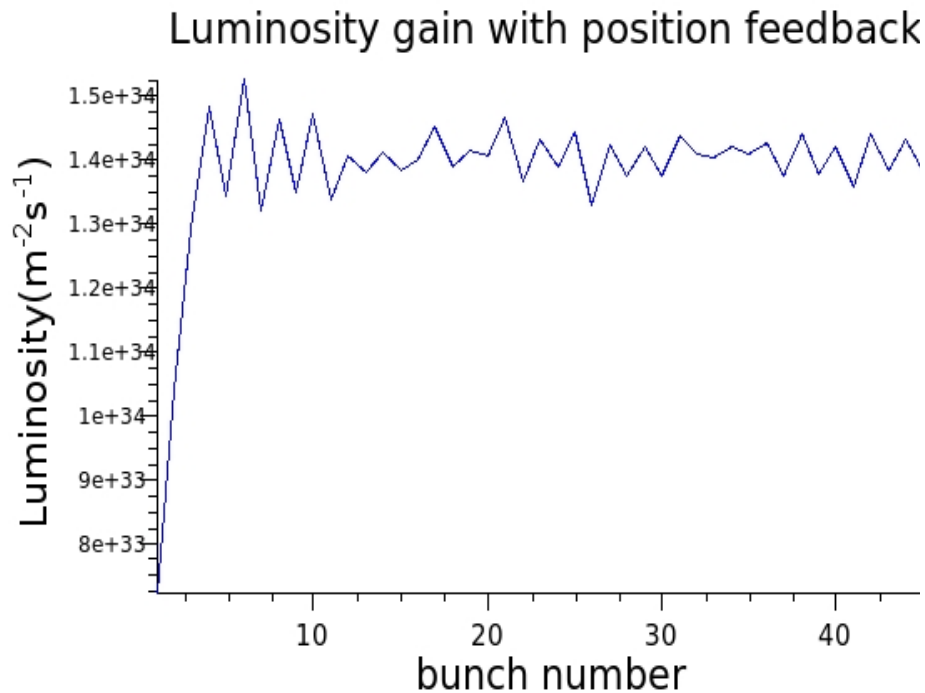
tune K_p and K_i using Zeigler-Nichols method

- Set $K_i = 0$ and increase K_p until ($K_p = K_c$) where output starts to oscillate with period P_c
- Then $K_p = 0.45 K_c$ and $K_i = 1.2 K_c / P_c$

Zeigler-Nichols K_p tuning



Luminosity gain – tuned, fast mode



- Steady state error perhaps need to increase K_i or tune setpoint
- Repeat for full mode simulation
- Can easily include upstream feedback
- How to include fast luminosity signal? Scan earlier? Use MIMO rather than SISO?