Highlights slide

- A steady-state Kalman filter has been implemented for the first time in IBM's TrueNorth: a neuromorphic chip.
- The TrueNorth chip encodes data using spikes, so both a rate encoded and rate-and-spatial encoded version, to reduce latency, of the SS-KF have been made.
- The performance of the TrueNorth kaman filter with respect to an equivalent numerical Kalman has been assessed whilst varying a number of parameters, including size of weight and threshold registers, size of encoding window for rate encoding, size of neuron block for spatial encoding, sample rate, and relative magnitude of measurement and process noise in the Kalman filter.
- Pros and cons of using such a device somewhere in an Offline toolchain have been assessed.

BERKELEY LAB

1

NSCS KF vs numerical KF for sin(x) - 1k tick encoding window, 1ms tick
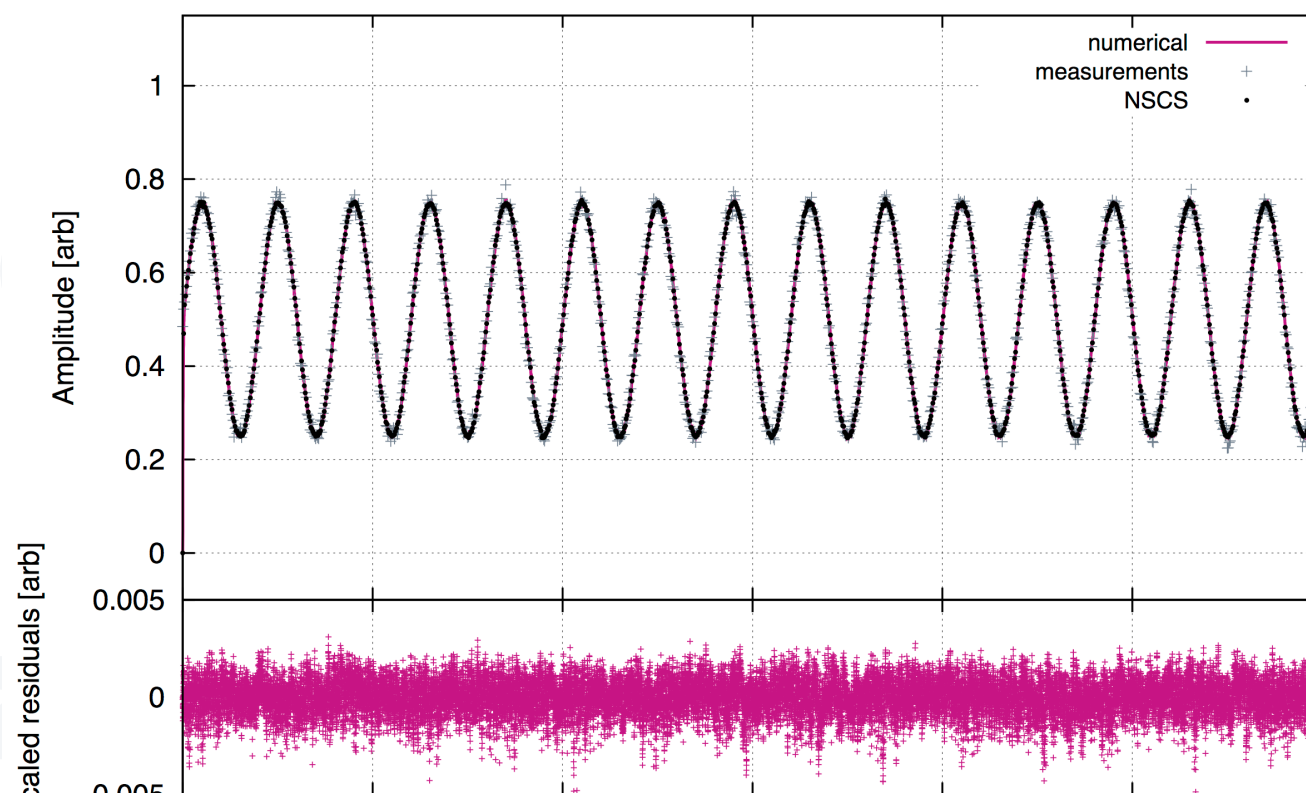
30000 iteration projectile KF, processNoise = oE-3, measNoise = oE-1, 1k tick encodingWindow