Energy Harvesting, Storage and Management for Automated Environment Monitoring in the East African Region

PROGRESS REPORT – March

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objective 1 – Normal progress

- Gateway is actively collecting data
  - Electron 3G global issue – bootloader gets corrupted when battery runs flat
  - Been asked to create a repeatable procedure that generates this bug and claim bounty
  - Won the **New Comer December 2017** Award on https://community.particle.io

Objective 2

- All set for Doha to present at IEEE CPE-POWERENG 2018
- Formatting 2nd paper on Self-discharge of LICs
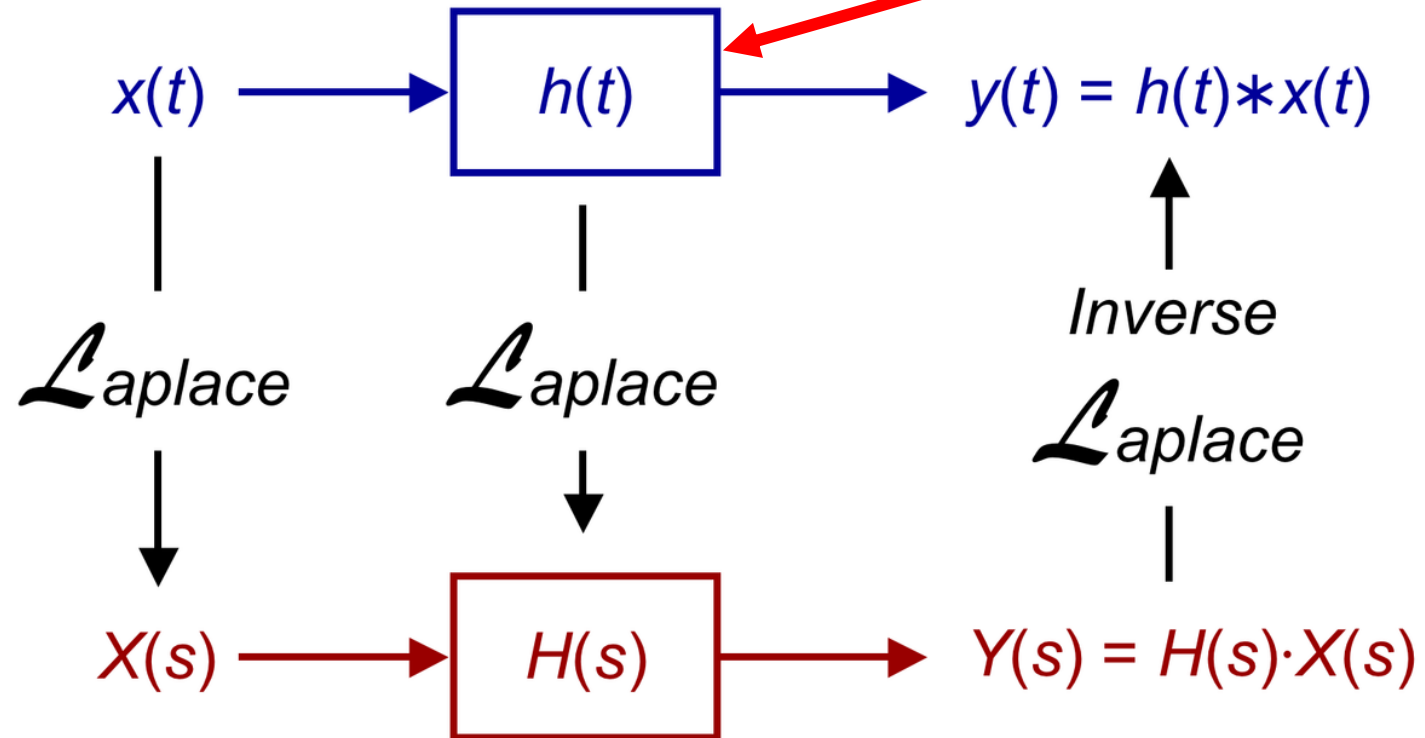 - Included theoretical framework supervisors asked for

Objective 3

❑ Gateway battery charge cycle data is available from Feb 15

  ❑ To be cleaned up—a few days missing, some data missing, formatting from transmission errors

❑ Obtained 2017 and 2018 (up to feb) solar insolation data from NASA

❑ Assuming system is Linear Time Invariant

❑ Time-domain analysis
❑ Frequency-domain analysis
❑ Neural network
❑ Other techniques

System identification

System Model

Time domain

$x(t)$ ⟶ $h(t)$ ⟶ $y(t) = h(t) * x(t)$

$\mathscr{L}aplace$ $\mathscr{L}aplace$ Inverse $\mathscr{L}aplace$

$X(s)$ ⟶ $H(s)$ ⟶ $Y(s) = H(s){\cdot}X(s)$

Frequency domain

system response: what the objective concerns itself with

April Plans

- Present in Doha (and look out for researchers with similar interests)
- Obtain System model for current data set (Feb, March)
- Analyze output dataset for whole years data and get preliminary solar panel sizing guidelines
- Thesis skeleton
- Pay tuition for past 2 years