Beyond Traditional Sampling Strategies for Enhanced Performance and Cost-Effectiveness

Motivation
- Present: mainly fixed sampling (single-rate, equidistant) → well-developed control design framework
- Problem: limited by performance/cost trade-off:

Applications in motion control
- Examples of flexible sampling:
  - multi-rate control [1]
  - non-equidistant sampling [2]
  - ...

Unified framework for flexible sampling

Case study: FF for non-equidistant sampling

Motivation:
- increasing performance and functionality
- resources scarce
- multiple applications share platform

Tasks executed on same processor → requires scheduling → non-equidistant sampling of motion system

Two approaches for (feedforward) control design:
I) settle with equidistant sampling rate ⇒ conservative
II) design for non-equidistant rate → exploit additional design freedom to break the performance/cost trade-off:

Concluding remarks
General framework for
- modeling,
- identification, and
- control of motion systems with flexible sampling

References