

Position: Execution under a power constraint is about **optimal control**.

- **Problem** [*a la Rountree's "Lesson 2"*]: Given a fixed power budget, allocate **computation** and **power** to components (processor, memory, disk, ...)
 - Computation is “tunable,” e.g., has explicit knobs to control task granularity, work-communication tradeoffs, ...
 - May trade power for performance explicitly for each component
- **Strawman approach**: Treat as **optimal control theory** problem, e.g., under closed-loop decentralized discrete-event control. (Analogy: Adaptive cruise control, UAVs.) This approach emphasizes dynamics, safety, and robustness.
- **Software challenges?**
 - Design APIs to **observe** and **control** system power allocation
 - Design APIs to express **dynamically tunable programs**
 - Design associated language, compiler, and runtime support