A Timeless Model for the Verification of Quasi-Periodic Distributed Systems

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Motivating Example

**Safety property:** speed is always in a valid range

**Liveness property:** speed eventually becomes zero if the operator sends stop command
Model Using State Machines

These systems are usually verified using model checking

\[ (s, t) \xrightarrow{\text{Discrete transition}} (s', t) \]

\[ (s, t) \xrightarrow{\text{Delay transition}} (s, t') \]

Continuous time progress

Discrete time progress

Timeless model:
- Eliminate the time notion; and so the delay transitions
- Allows checking of safety properties
- Not suitable for checking of liveness properties
- Source of fairness violation: processes that need at least zero messages in their buffers to get enabled