**On the Effects of Network Delays on an Energy-based Controller**

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**Mass Point Vehicles Control**

- Vehicles modeled as mass points
- Control inputs forces to achieve desired spacing
- Kinetic energy shaping by splitting velocity vectors
- Dissipation for asymptotic stability

**Energy-Based Controller for Nonholonomic Vehicles**

- Generation of velocities satisfying nonholonomic constraints
- Modified kinetic energy shaping using Lagrange multipliers
- Modified dissipation

**Network Model**

- Chanel modeled with a Rayleigh distribution
- Spacing is calculated using only transmitted information
- Ethernet with UDP protocol (no retransmitting)
- Network model can not be considered in the energy-based controller design

**Simulation Results**

- Desired spacing is 3m
- Initialization with velocity and position errors
- Stable behavior up to 200ms observed
- Random delays are simulated with and without constant component
- The presence of random delay deteriorates the controller performance
- The sensibility to the time delays is due to the model based approach
- Sensor fusion using spacing sensors can improve performance