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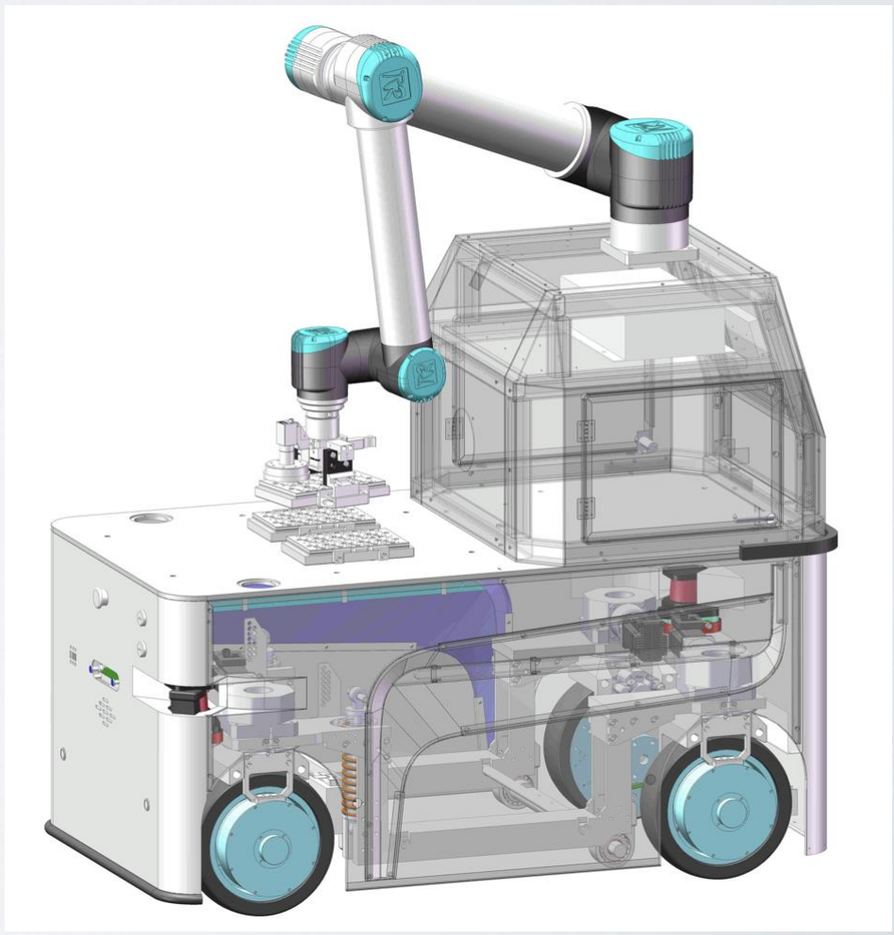
Robust self-triggered switching control of autonomous ground vehicles with varying linear parameters

Key words:

Varying linear parameters; Autonomous ground vehicle; Switching controller; Zeno avoidance; Robust control;



Background

- **FAGV**: high maneuverability
- **Challenges**: nonlinearity, parameter variations, disturbances
- **Traditional methods**: limited robustness, high-frequency switching issues

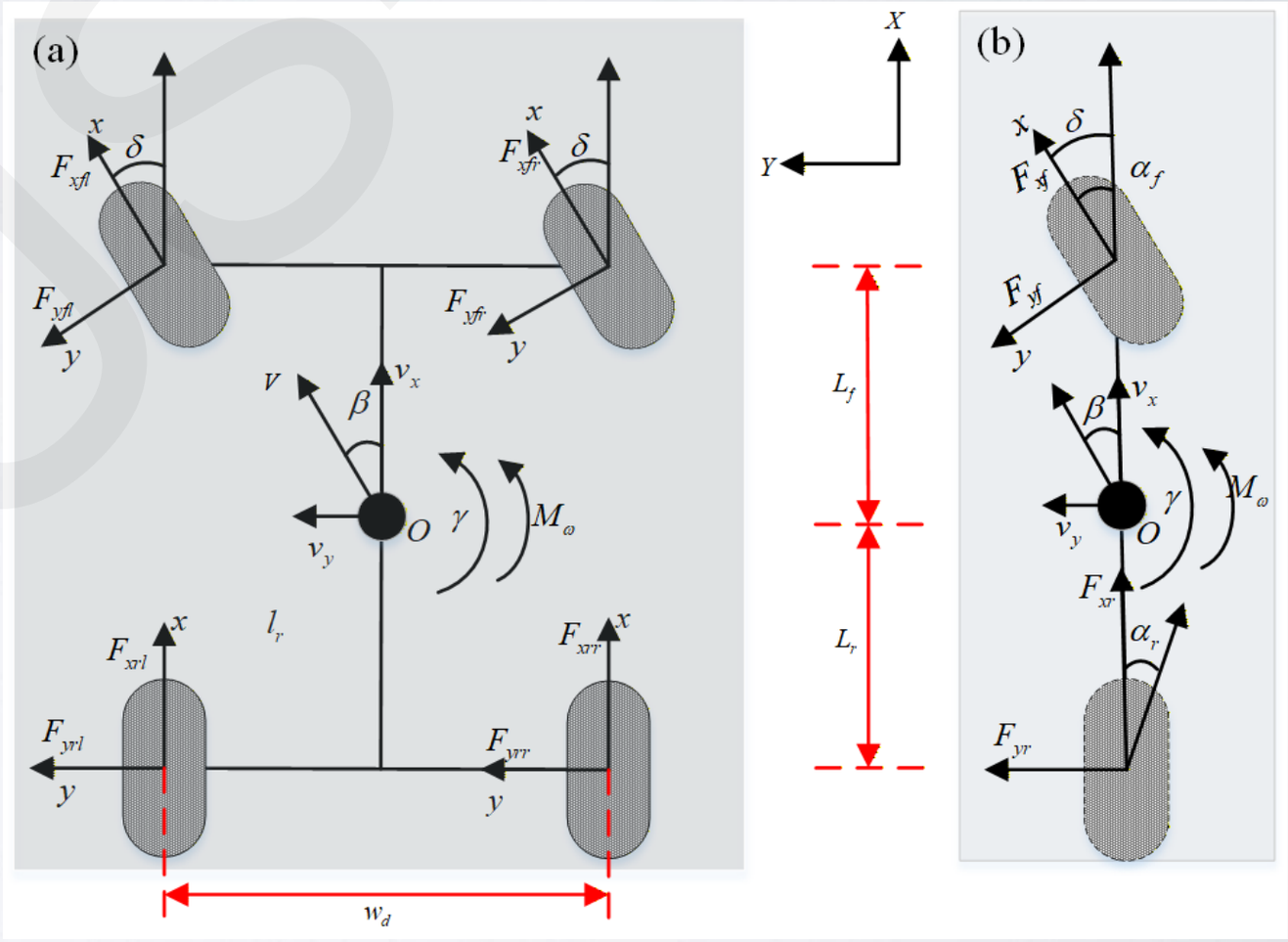


Objective

- **Improve trajectory tracking accuracy**
- **Ensure robustness under varying parameters**
- **Reduce control update burden**

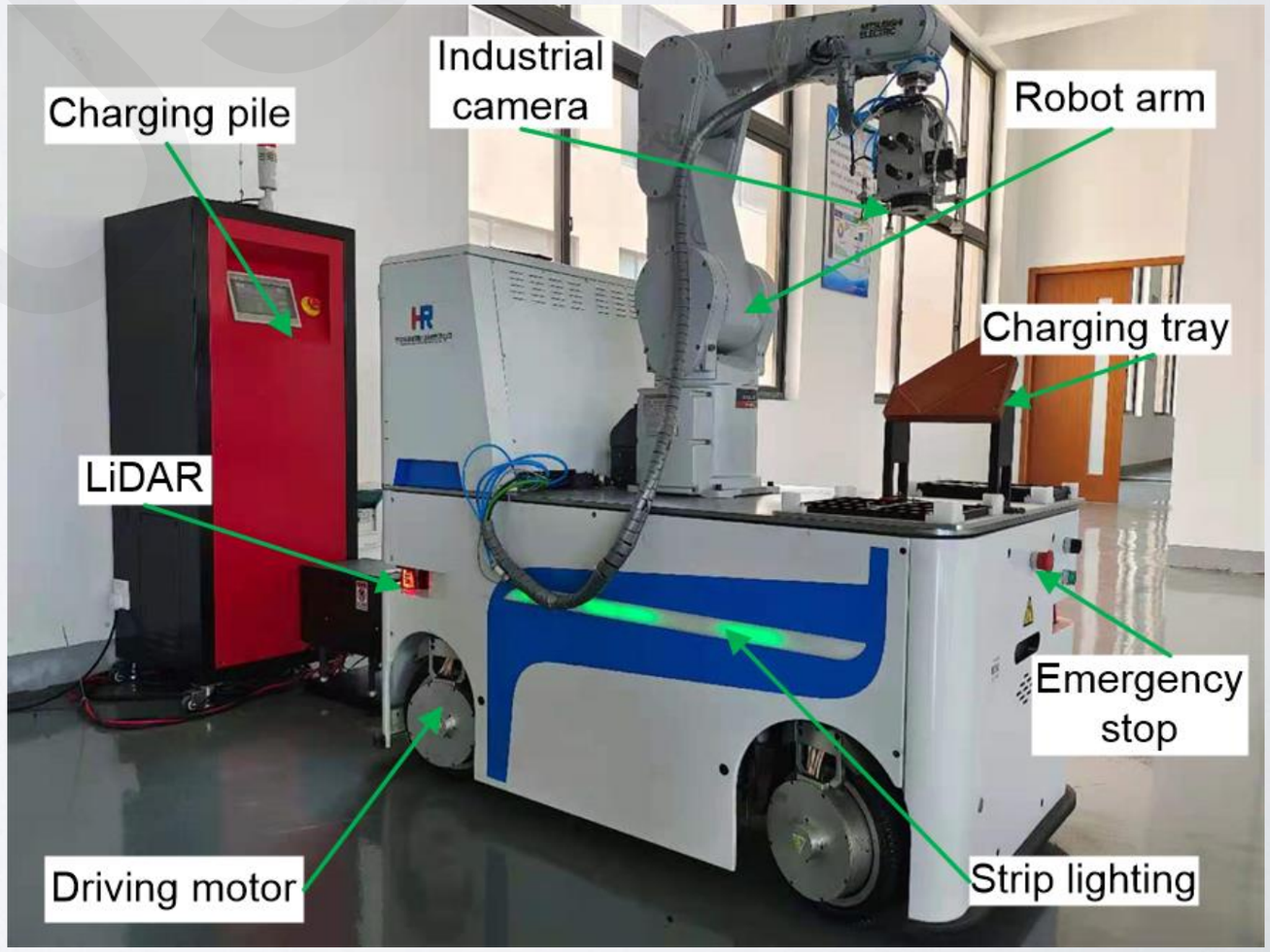
Method Framework

- **Nonlinear system → LPV modeling**
- **Switched LPV system**
- **Self-triggered switching**
- **Gain scheduling control**



Experimental Results

- **Compared with PID, SMC, F-LPV**
- **Overshoot reduced up to ~84%**
- **Improved robustness**



Conclusions

- **Enhanced tracking performance**
- **Strong robustness**
- **Promising for intelligent vehicles & robotics**
- **Future: consider network delays**