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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**

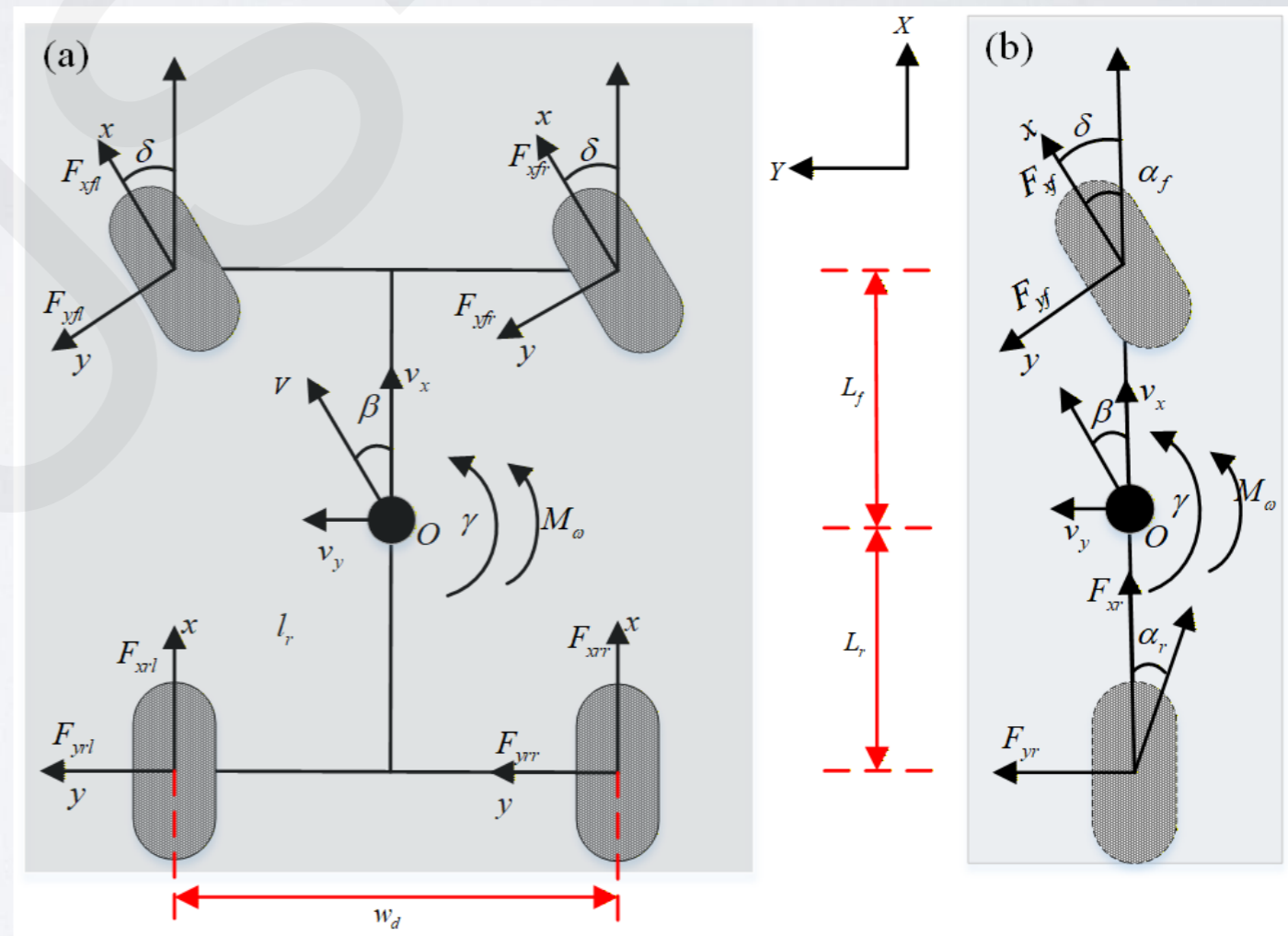
Method Framework

➤ Nonlinear system → LPV modeling

➤ Switched LPV system

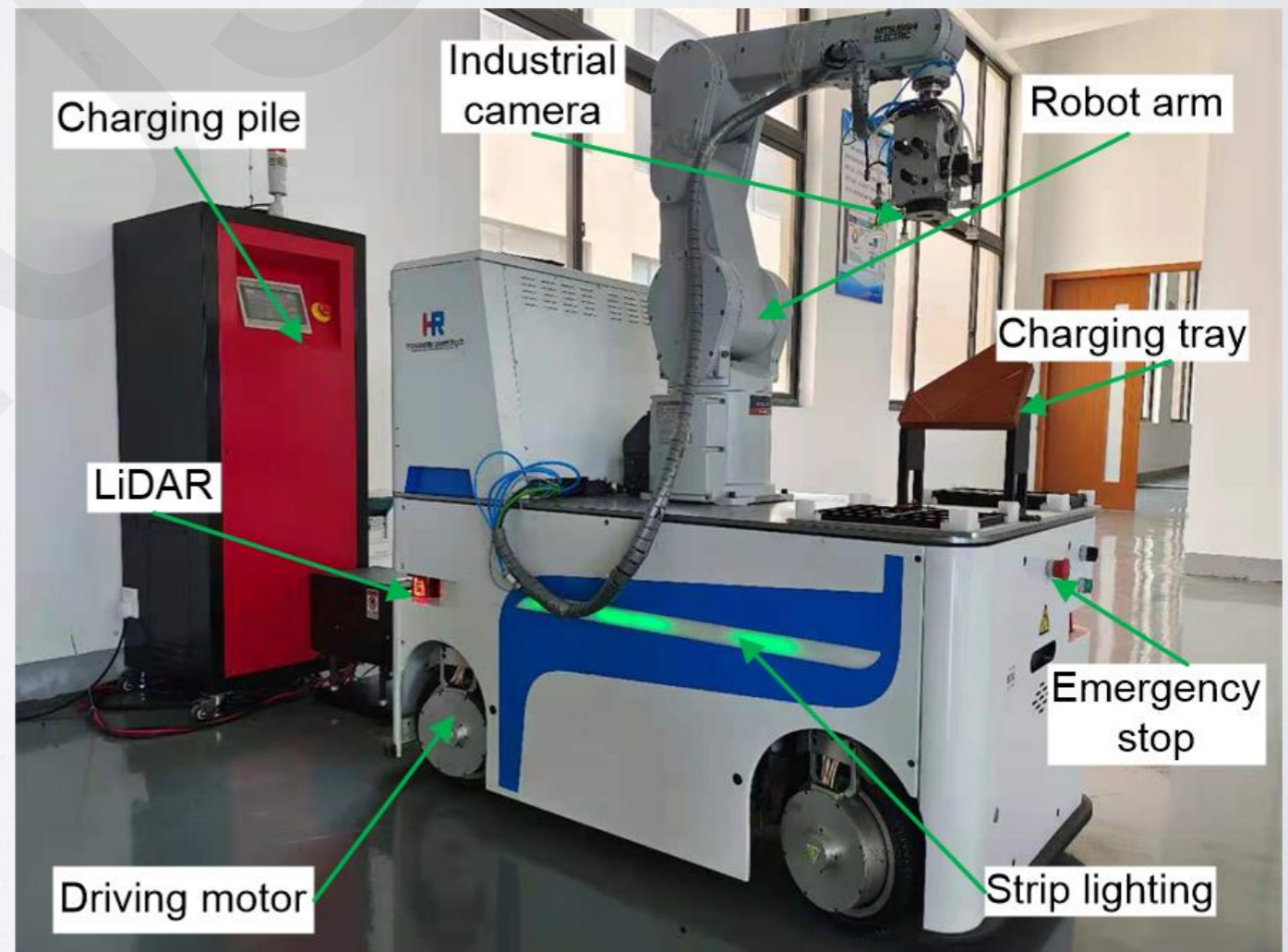
➤ Self-triggered switching

➤ 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**