

Poster presentation for paper at EPE23', Paper title: Modelling and Stability Analysis of 100kW Modular Dual Active Bridge Converter for Robotic Arm-based Charging Systems

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Modelling and Stability Analysis of 100kW Modular Dual Active Bridge Converter for Robotic Arm-based Charging Systems

Ramy Kotb^{1,2}, Haaris Rasool^{1,2}, Sajib Chakraborty^{1,2} and Omar Hegazy^{1,2}

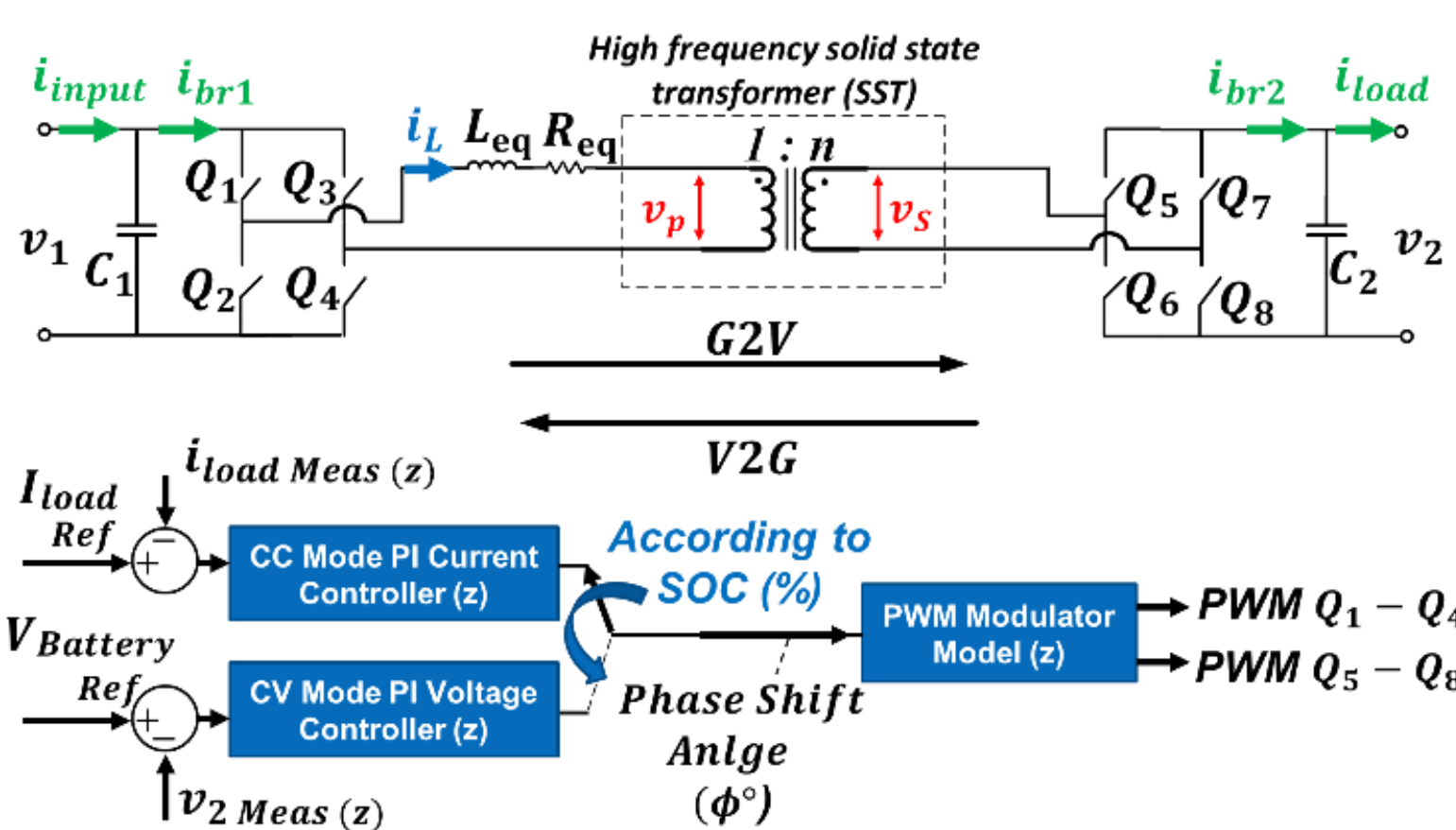
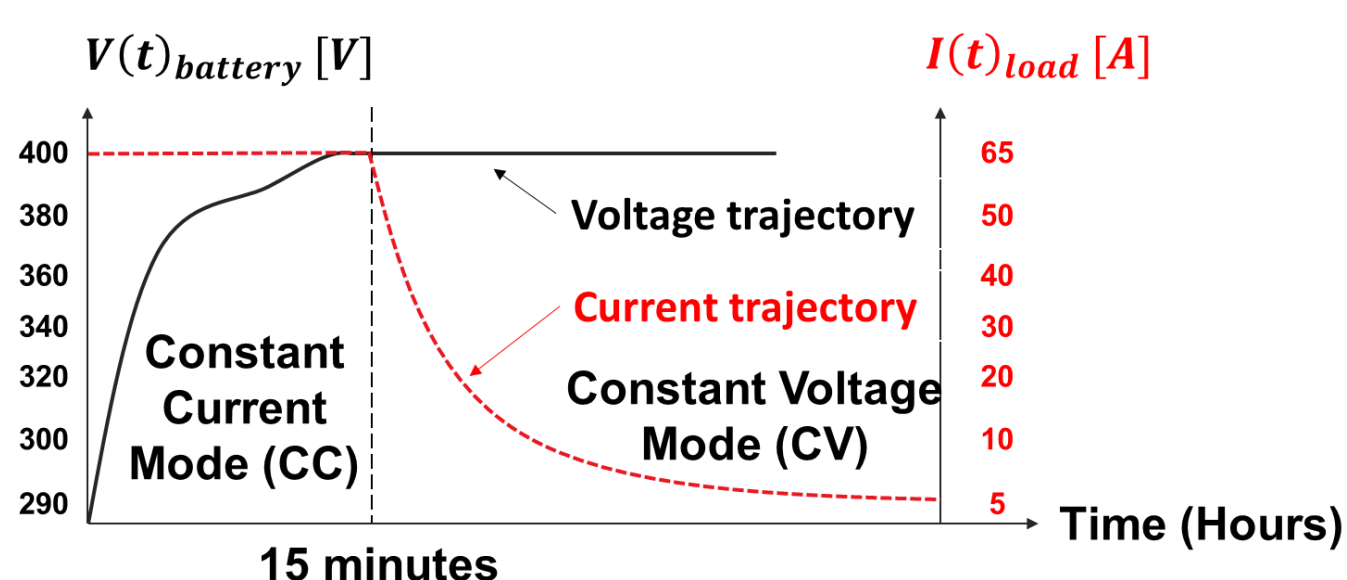
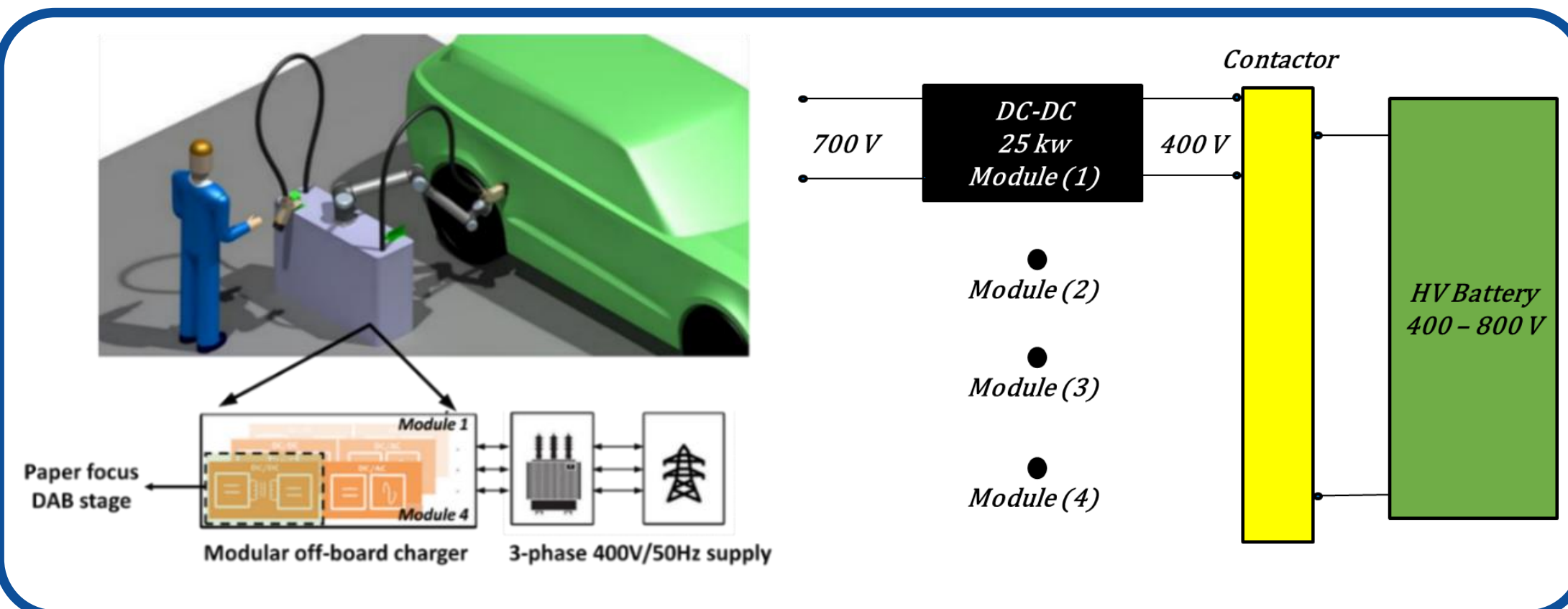
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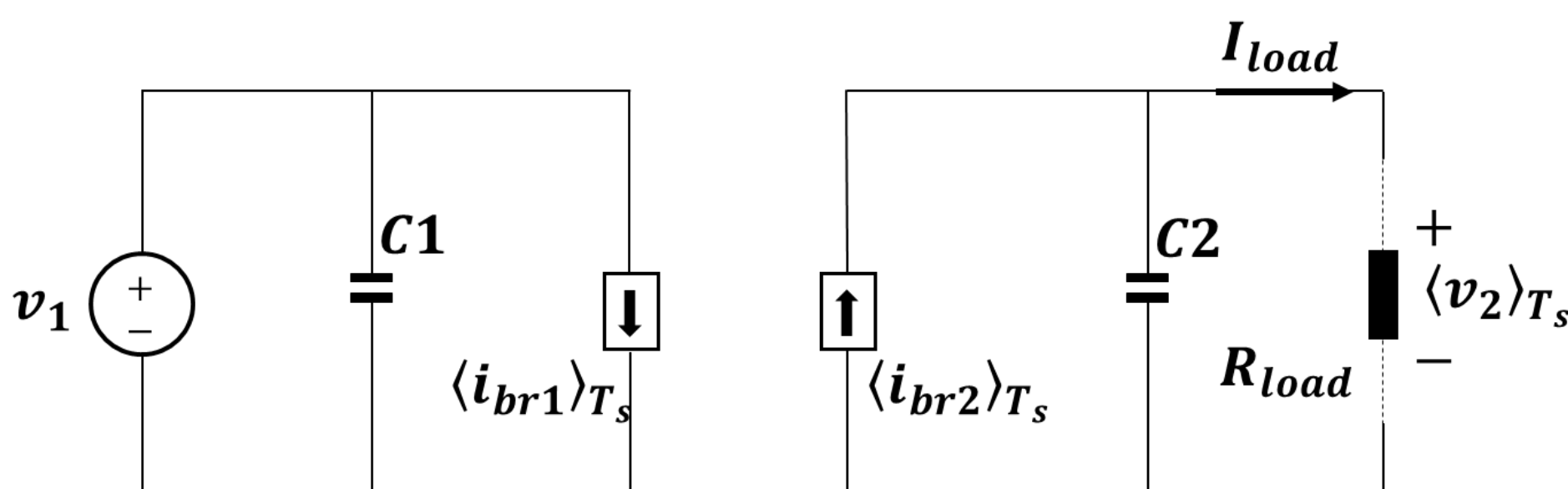
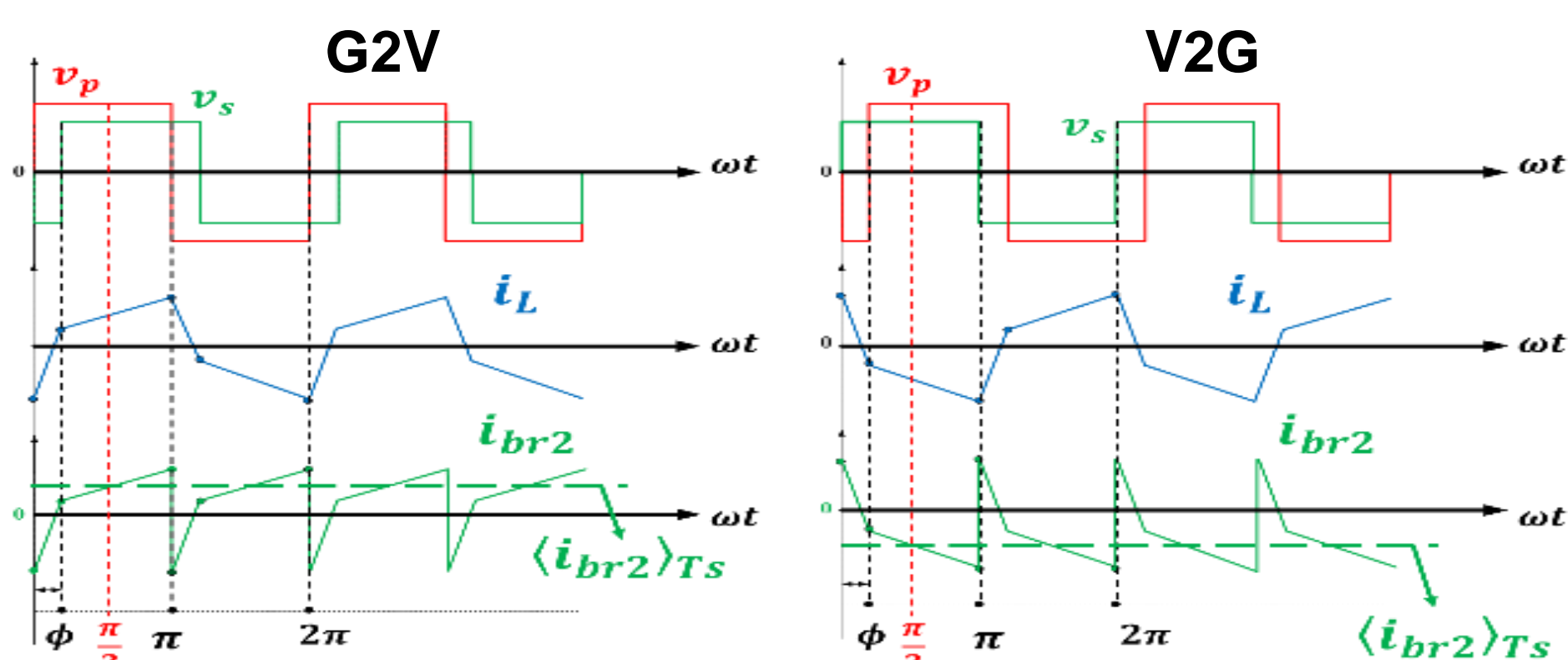
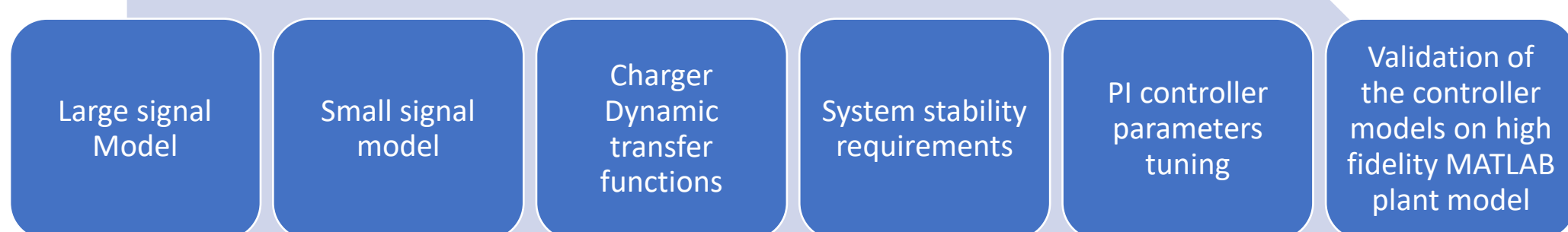
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Research Project Objectives:

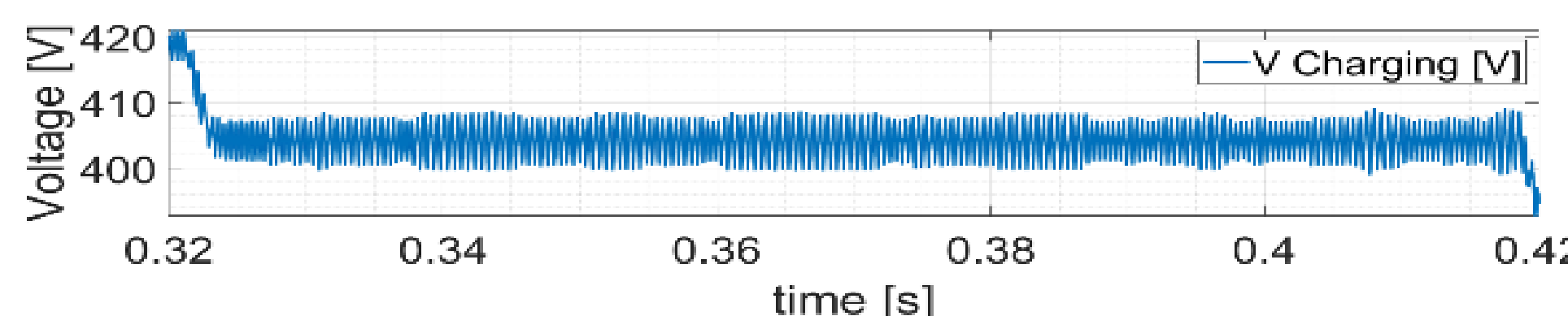
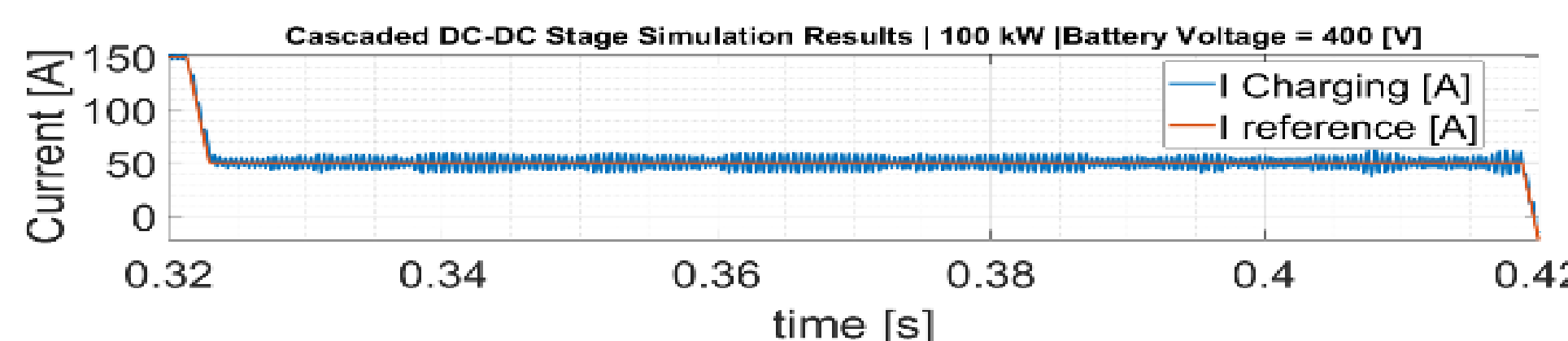
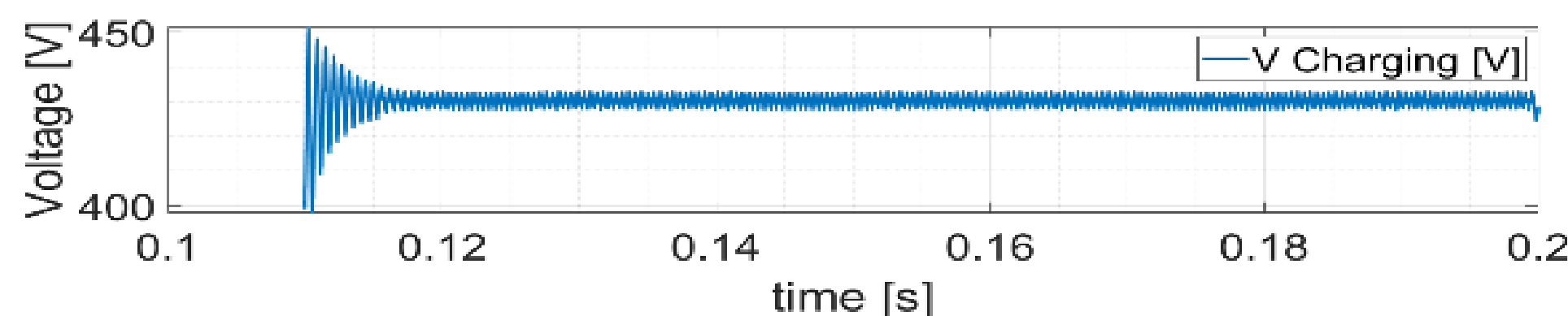
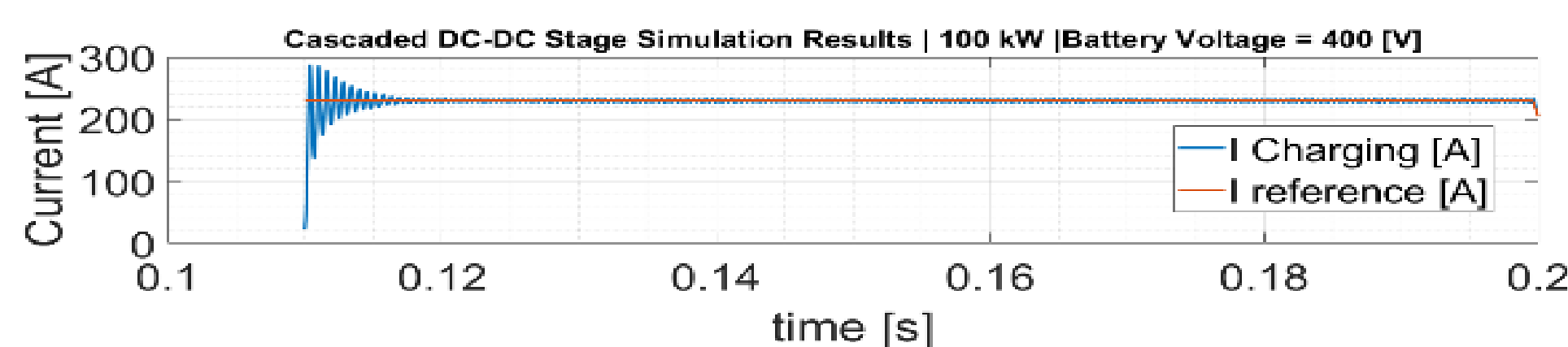
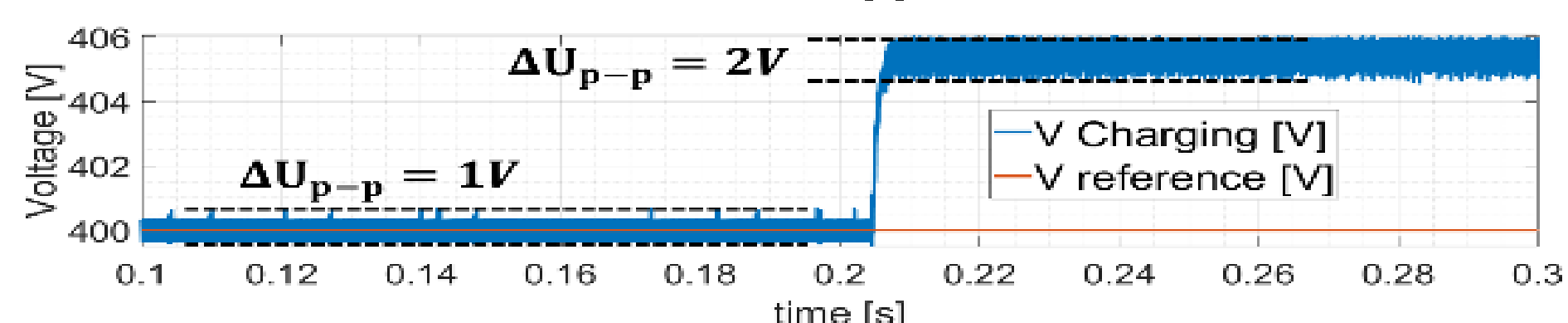
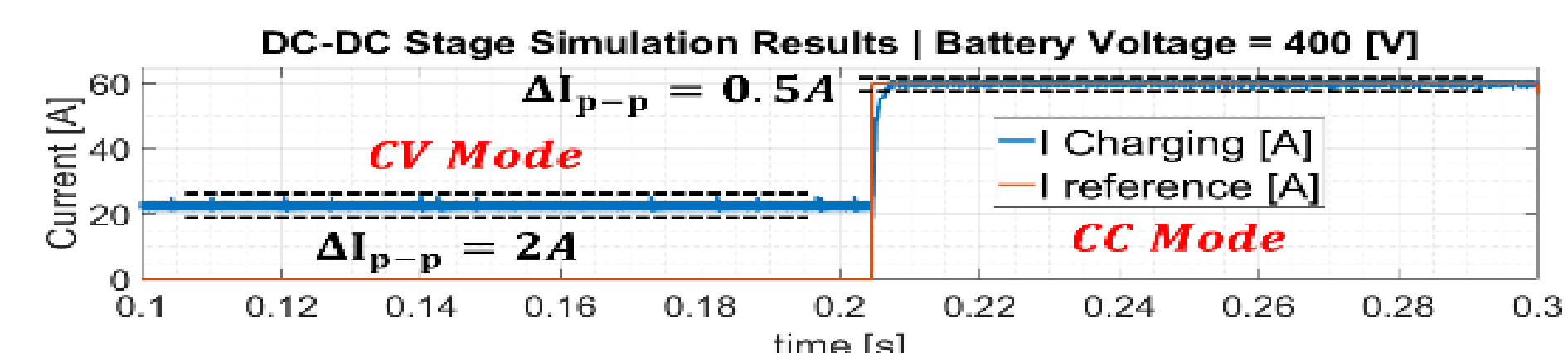
- Design a modular DC off-board charger power electronics system for a robotic arm-based charging system.
- Investigate the application of Wide Band Gap (WBG) SiC semiconductor in achieving high system efficiency of beyond 98%.
- Design and validate the stability of the off-board charger's control system in different modes of operation, e.g., G2V and V2G.



Methodology for control design and stability analysis



Results and discussion



Conclusion

- Simulation verifies 3ms off-board charger response in CC mode, suitable for the application.
- It has been observed that the controller's performance deteriorated when the four cascaded modules were connected in a parallel-input-parallel-output configuration at low charging power levels.