# Sliding mode controlled of interleaved boost converter for PEMFC application

*Jie Ying Tan* [a], *R. M. T. Raja Ismail* [b]
[a] Universiti Malaysia Pahang, Institute of Postgraduate Studies, Pahang, Pekan, 26600, Malaysia
[b] Universiti Malaysia Pahang, Robotics, Intelligent Systems & Control Engineering (RISC), Research Group Faculty of Electrical & Electronics Engineering Technology, Pahang, Pekan, 26600, Malaysia

**ABSTRACT**
This paper presents a sliding mode control (SMC) in a two-phase interleaved boost converter (IBC) for a proton exchange membrane fuel cell (PEMFC). The purpose of this paper is to obtain the maximum power point from the PEMFC during the occurrences of fuel cell supplied pressure variations. Reference current values are set for the SMC to reach the maximum power point of different operating conditions. The two-phase interleaved boost converter is worked with PEMFC to produce high voltage output and minimize the current and voltage ripple of the PEMFC system. Therefore, the proposed SMC is to ensure that the fuel cell current is set to extract maximum power to the interleaved boost converter that is connected between the PEMFC system and the load. The stability analysis is done in a closed-loop system. MATLAB/Simulink is used to generate the results of the proposed sliding mode control. Simulations results discussed the fast dynamic system robustness under fuel cell supplied pressure variations. Furthermore, the effectiveness of the sliding mode controller to track down the reference values is demonstrated in the presence of unknown disturbances.

**KEYWORDS**
IBC; PEMFC; SMC

**ACKNOWLEDGEMENTS**

This research is supported by the Ministry of Education (FGRS/1/2021/TK0/UMP/02/71) and University Malaysia Pahang under grant number RDU210128.