

Modeling and simulation of an electric propulsion system equipped with Fuel Cell

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Abstract

The paper proposes the modelling of an electric propulsion system that uses as the main energy source, a Fuel Cell. The model is based on the structure of Toyota MIRAI, the first electric vehicle equipped with Fuel Cell developed in series in 2015. The model is developed under MATLAB Simulink software and adapts existing fuel cell and vehicle blocks to the real vehicle case. The simulation results contain the time evolution of some important parameters for both fuel cell and vehicle. Conclusions analyse these results and suggest future possible pathways of study.

Keywords: electric propulsion systems, fuel cells, vehicles

References

1. Ehsani Mehrdad, Gao Yimin and Emadi Ali Fundamentals, Theory and Design Second (Texas, U.S.A: Texas A&M University College Station) Modern Electric, Hybrid and Fuel Cell Vehicles
[Go to reference in articleGoogle Scholar](#)
2. Larminie J. and Lowry J. Electric Vehicle Technology Explained (Oxford, U.K: Oxford Brookes University)
[Go to reference in articleGoogle Scholar](#)
3. Yulianto Ahmad, Simic, Taylor M., Trivailor D. and Pavel Modelling of full electric and hybrid electric fuel cells buses International Conference on Knowledge Based and Intelligent Information and Engineering Systems, KES2017 (Marseille, France, 6-8 September 2017)
[Go to reference in articleGoogle Scholar](#)
4. Cerdan Codina Abert 2017 (CHALMERS UNIVERSITY OF TECHNOLOGY) System Level modelling of fuel cell driven electric vehicles
[Go to reference in articleGoogle Scholar](#)
5. Kavyapriya S. and Krishna Kumar R. 2020 Modeling and Simulation of DC-DC Converters for Fuel Cell System International Journal of Engineering and Advanced Technology (IJEAT) ISSN: 2249-8958 9 February
[Go to reference in articleGoogle Scholar](#)
6. Gupta Sandeep, Singh Swati, Mathew Lini and Shimi S. L. Comparative Study of Dc To Dc Converters Via Simpowerelectronics Fuel Cell Stack IOSR Journal of Engineering (IOSRJEN)

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www.iosrjen.org ISSN (e): 2250-3021, ISSN (p): 2278-8719 04 January. 2014

[Go to reference in articleGoogle Scholar](#)

7. Bertini L. Modeling and Optimization of a Fuel Cell Hybrid System Master thesis KTH
Royal Institute of Technology, Division of Applied Electrochemistry

[Go to reference in articleGoogle Scholar](#)

8. Medium And Heavy Duty Fuel Cell Electric Vehicles – California Environmental Protection
Agency, AIR RESOURCES BOARD, November 2015

[Go to reference in articleGoogle Scholar](#)

9. Toyota Mirai FCV_Posters_LR_tcm-11-564265 – technical data sheet of the vehicle, 2020

[Go to reference in articleGoogle Scholar](#)

10. <https://seekingalpha.com/article/3965730-are-hydrogen-cars-threat-to-electric-vehicle>

[Go to reference in articleGoogle Scholar](#)