


# 15<sup>th</sup> International Green Energy Conference (IGEC XV) | July 10-13, 2023 | In-person & online

Name	Shigeki Hasegawa	
Affiliation	Kyoto University, Toyota Motor Corporation	
<h2 style="color: red;">Invited Plenary Lecture</h2>		
Presentation Title	<b>Development of physical model based fuel cell system simulator for multi-purpose application</b>	
Abstract (Approximately 200 words)	<p>An integrated fuel cell (FC) electric vehicle model is developed, which consists of the 1-D physical models of all the system component such as the FC stack as main engine and subsystems of air, hydrogen, and cooling, and the related controllers. All the codes for the physical models and controllers are implemented on the basic MATLAB/Simulink platform efficiently as white-box models without any additional toolboxes and external functions. It can be converted easily to a variety of FC system application such as railway, marine, aviation, and stationary power generator purposes, as well as automotive of the passenger vehicles, buses, and trucks. The models were validated by the considerable amount of database collected with the state-of-the-arts commercial FCEV, 2nd-generation MIRAI, and users can focus on the system design without the concern about accuracy. The authors expect that a significant cost and effort for manufacturing prototypes and controller calibration can be reduced by introducing it in the design phase before prototyping and evaluation phase.</p>	
Biographical Sketch (Approximately 200 words)	<p>Graduated from Undergraduate School of Chemical Science and Technology of Kyoto University in 2002, Graduate School of Energy Science of Kyoto University and joined Toyota Motor Corporation (TMC) in 2004. Through 19-year career in TMC, experienced wide range of the technical fields surrounding fuel cell electric vehicle (FCEV) including advanced material development of MEA, fuel cell and stack design, system architecture and controller design, market product quality investigation, and model-based development (MBD). Since 2020, working as project manager in TMC and concurrently affiliated with Kyoto University as a program-specific assistant professor (NEDO FC-Platform Project) to research model-based system engineering (MBSE) process of fuel cell system.</p> <p>Specialized technical fields: chemical engineering; electrochemistry; numerical simulation; control engineering; and model-based system development (MBD/MBSE).</p>	