Design and Modeling of An Integrated Fuel Cell and Energy Storage System to Enhance Power System Performance and Reliability in Energy Storage Systems (PolyU 5245/04E) (2004~2007)

Outcomes

•Developed a mathematic model of both dynamic and state-state for fuel cell

•Study fuel cell with magnetic energy storage

•Propose a new family of ZCS and ZVS power conditioners

Published papers

•2 Journal papers







Fuel cell vehicle

Unified Mathematical Modelling of Steady-State and Dynamic Voltage-Current Characteristics for PEM Fuel Cells

Developed a novel approach for optimization of the operating points of fuel cells and design of power conditioning units, simulators, and system controllers.



Basic Formulated parameters of a steady-state PEM fuel cell approach Discrete data of Discrete data of steady transient component component Least squares technique Steady Transient polynomial polynomial First-order time delay Unified mathematical modelling Output steady-Output dynamic state charcteristics charcteristics

Electrochemical Acta

ZVS and ZCS Converters

IET Power Electronics

- 1. Work well with fuel cells
- 2. Has been applied to fuel cell vehicle
- 3. Zero-current and zerovoltage switching are realized.
- 4. Family of circuits developed





