Document details

‹ Back to results | ‹ Previous 5 of 54 Next ›

Export Download Print E-mail Save to PDF Add to List More... ›

View at Publisher

2018 IEEE Industry Applications Society Annual Meeting, IAS 2018
26 November 2018, Article number 8544662
2018 IEEE Industry Applications Society Annual Meeting, IAS 2018; Portland; United States; 23 September 2018 through 27 September 2018; Category numberCFP18IAS-ART; Code 143074

IDA-passivity-based control for on-board DC power converter system with constant power load (Conference Paper)

Pang, S.[a], Nahid-Mobarakeh, B.[a], Pierfederici, S.[a], Phattanasak, M.[a], Huangfu, Y.[b], Luo, G.[b], Gao, F.[c]

[a]Université de Lorraine, Nancy, France
[b]Northwestern Polytechnical University (NPU), Xi'an, China
[c]Université de Technologie de Belfort-Montbéliard (UTBM), Belfort, France

Abstract

View references (25)

Moving toward more electric aircraft (MEA) concept, electrification of modern aircraft will consist of a large amount of constant power load (CPL), which giving tough stability problems and research opportunities. In such an application, on-board dc power system may have a time-varying system structure and operation pattern due to the flexibility of the distributed loads. This feature poses challenges for system stability and increases the difficulty of the stability analysis. To solve this problem, an interconnection and damping assignment (IDA) passivity-based controller (PBC) is proposed in this paper. Particularly, an adaptive interconnection matrix is designed for building the internal links in port-controlled Hamiltonian (PCH) system, and the virtual damping assignment technique is addressed to tune the dynamic characteristic. To meet all the electricity supply needs, the design procedures were introduced for determining the control law in both boost converter and buck converter cases. Simulation and experimental results are performed to confirm the proposed control algorithm. Results show that the proposed control approach ensures the stability and the fast response of the system in different cases when the CPL changes. © 2018 IEEE

SciVal Topic Prominence

Topic: Electric potential | Electric power distribution | power loads

Prominence percentile: 99.496

Author keywords

Boost converter | Buck converter | Constant power load (CPL) | DC-DC converter | interconnection and damping assignment (IDA) | More electric aircraft (MEA) | On-board power system | Passivity-based control (PBC) | Port-controlled Hamiltonian system (PCHS)

Indexed keywords

Engineering controlled terms: Aircraft | Damping | DC-DC converters | Electric inverters | Electric vehicles | Hamiltonians | Power control | System stability | Time varying systems

Engineering uncontrolled terms: BOOST converter | Buck converters | Constant power loads (CPL) | Interconnection and damping assignment | More electric aircraft | Passivity based control | Port-controlled hamiltonian systems | Power System

Engineering main heading: Electric power system control

Metrics

0 Citations in Scopus

0 Field-Weighted Citation Impact

PlumX Metrics

Usage, Captures, Mentions, Social Media and Citations beyond Scopus.

Cited by 0 documents

Inform me when this document is cited in Scopus:

Set citation alert ›

Set citation feed ›

Related documents

IDA-Passivity-Based Control for Boost Converter with LC Filter Supplying Constant Power Load
Pang, S., Nahid-Mobarakeh, B., Pierfederici, S.
(2019) 2018 IEEE International Conference on Electrical Systems for Aircraft, Railway, Ship Propulsion and Road Vehicles and International Transportation Electrification Conference, ESARS-ITEC 2018

Research on LC filter cascaded with buck converter supplying constant power load based on IDA-passivity-based control
Pang, S., Nahid-Mobarakeh, B., Luo, G.
(2018) Proceedings: IECON 2018 - 44th Annual Conference of the IEEE Industrial Electronics Society

DC Microgrid Topologies and Stability Analysis for Electrified Transportation Systems
Pang, S., Nahid-Mobarakeh, B., Pierfederici, S.
(2018) Proceedings - 2018 IEEE 18th International Conference on Power Electronics and Motion Control, PEMC 2018

View all related documents based on references

Source Type: Conference Proceeding
Original language: English
Document Type: Conference Paper
Publisher: Institute of Electrical and Electronics Engineers Inc.

References (25)

1 Huangfu, Y., Pang, S., Nahid-Mobarakeh, B., Guo, L., Rathore, A.K., Gao, F.

Stability Analysis and Active Stabilization of On-board DC Power Converter System with Input Filter

(2018) *IEEE Transactions on Industrial Electronics*, 65 (1), art. no. 7926373, pp. 790-799. Cited 15 times.
http://ieeexplore.ieee.org/xpl/tocresult.jsp?isnumber=5410131
doi: 10.1109/TIE.2017.2703663

View at Publisher

2 Jia, Y., Rajashekara, K.

An Induction Generator-Based AC/DC Hybrid Electric Power Generation System for More Electric Aircraft

(2017) *IEEE Transactions on Industry Applications*, 53 (3), art. no. 7812661, pp. 2485-2494. Cited 9 times.
doi: 10.1109/TIA.2017.2650862

View at Publisher

3 Barater, D., Immovilli, F., Soldati, A., Buticchi, G., Franceschini, G., Gerada, C., Galea, M.

Multistress Characterization of Fault Mechanisms in Aerospace Electric Actuators

(2017) *IEEE Transactions on Industry Applications*, 53 (2), art. no. 7762895, pp. 1106-1115. Cited 15 times.
doi: 10.1109/TIA.2016.2633948

View at Publisher

4 Xu, Q., Wang, P., Chen, J., Wen, C., Lee, M.Y.

A Module-Based Approach for Stability Analysis of Complex More-Electric Aircraft Power System

(2017) *IEEE Transactions on Transportation Electrification*, 3 (4), art. no. 7904734, pp. 901-919. Cited 6 times.
https://www.ieee.org/membership-catalog/productdetail/showProductDetailPage.html?product=PER473-ELE&utm_source=Mainsite_CSE&utm_medium=CSE_Promotion&utm_campaign=Catalog_Promotion-PER473
doi: 10.1109/TTE.2017.2695886

View at Publisher

5 Tariq, M., Maswood, A.I., Gajanayake, C.J., Gupta, A.K., Sasongko, F.

Battery energy storage system integration to the more electric aircraft 270 V DC power distribution bus using peak current controlled dual active bridge converter

(2017) *2017 IEEE Energy Conversion Congress and Exposition, ECCE 2017*, 2017-January, art. no. 8096412, pp. 2068-2073. Cited 4 times.
ISBN: 978-150902998-3
doi: 10.1109/ECCE.2017.8096412

View at Publisher

6 Valdivia, V., Barrado, A., Lazaro, A., Sanz, M., Lopez Del Moral, D., Raga, C.

Black-box behavioral modeling and identification of DC-DC converters with input current control for fuel cell power conditioning

(2014) *IEEE Transactions on Industrial Electronics*, 61 (4), art. no. 6529127, pp. 1891-1903. Cited 17 times.
http://ieeexplore.ieee.org/xpl/tocresult.jsp?isnumber=5410131
doi: 10.1109/TIE.2013.2267692

View at Publisher