

University of Groningen

Energy-based analysis and control of power networks and markets

Stegink, Tjerk Wiebe

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version

Publisher's PDF, also known as Version of record

Publication date:

2018

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Stegink, T. W. (2018). *Energy-based analysis and control of power networks and markets: Port-Hamiltonian modeling, optimality and game theory*. [Thesis fully internal (DIV), University of Groningen]. Rijksuniversiteit Groningen.

Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.

Stellingen

behorende bij het proefschrift

Energy-based analysis and control of power networks and markets

van

Tjerk W. Stegink

1. Also intermediate-order multi-machine models admit port-Hamiltonian representations and shifted passivity properties. (Chapter 2)
2. Using shifted passivity, power system dynamics and real-time dynamic pricing algorithms can successfully be coupled to achieve an asymptotically stable closed-loop system with welfare maximizing equilibria. (Chapters 3,4,5,6)
3. Nodal power constraints (as well as line congestion and transmission costs) can successfully be incorporated in dynamic pricing algorithms achieving optimal power allocation in (a)cyclic nonlinear power networks. (Chapter 5)
4. Optimal power sharing and frequency regulation for high- and low-dimensional power networks dynamics can be ensured by consensus-based control algorithms. (Chapters 4 and 7)
5. Projected primal-dual dynamics for (nonstrict) convex optimization problems with hard inequality constraints are pointwise asymptotically stable. (Chapter 8)
6. Appropriate real-time (iterative) price-bidding mechanisms for strategic generators lead to a Nash equilibrium, economic dispatch and frequency regulation. (Chapters 9 and 10)
7. We shall not cease from exploration and the end of all our exploring will be to arrive where we started and know the place for the first time.