Effects of fish size and route of infection on virulence of a Danish Yersinia ruckeri O1 biotype 2 strain in rainbow trout (Oncorhynchus mykiss)

The comparative virulence of Yersinia ruckeri serotype O1 biotype 2 strain 07111224 from a Danish outbreak of enteric redmouth disease in rainbow trout (Oncorhynchus mykiss) was investigated in different sizes of rainbow trout (5, 19, 25 and 52 g) using a panel of challenge methods (bath, intraperitoneal (IP) injection, anal intubation and cohabitation). The results show that Y. ruckeri 07111224 is virulent enough to successfully cause mortality in 5–52 g rainbow trout through three different infection routes (bath, IP injection and anal intubation), and strongly suggests that susceptibility to Y. ruckeri infection is dependent on fish size. Bath challenge (10^6 CFU/ml) caused 79% mortality in 5 g fish, while the mortality in 19–52 g fish was approximately 26%. IP injection challenges (10^5–10^6 CFU/individual) resulted in high mortalities in fish of all sizes. Anal intubation challenges (10^9 CFU/individual) induced 82% mortality in 5 g fish and decreased with increasing fish weight. Finally, cohabitation challenges induced 45% mortality in 5 g test fish when test fish were cohabitated 1:1 with shedder fish, while mortalities in test fish of five other challenge groups were lower (5–25%). Statistical models were fit to the data from each challenge model. The model parameter predictions suggests statistically significant effects of fish weight for bath, IP and anal intubation challenges. Furthermore, they highlight the importance of the ratio of shedders to test fish in cohabitation challenges and of the challenge doses, in particular for the IP challenge model.

General information
State: Published
Organisations: National Veterinary Institute, University of Copenhagen, BioMar Group, Aarhus University
Pages: 519-526
Publication date: 30 Mar 2019
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Publication information
Journal: Aquaculture
Volume: 503
ISSN (Print): 0044-8486
Ratings:
BFI (2019): BFI-level 2
Web of Science (2019): Indexed yes
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Scopus rating (2017): CiteScore 3.05 SJR 1.152 SNIP 1.58
Web of Science (2017): Impact factor 2.71
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 2.75 SJR 1.122 SNIP 1.51
Web of Science (2016): Impact factor 2.57
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): CiteScore 2.12 SJR 1.107 SNIP 1.256
Web of Science (2015): Impact factor 1.893
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): CiteScore 2.16 SJR 1.01 SNIP 1.33
Web of Science (2014): Impact factor 1.878
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 2.18 SJR 1.151 SNIP 1.293
Web of Science (2013): Impact factor 1.828
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 2.32 SJR 1.222 SNIP 1.485
Web of Science (2012): Impact factor 2.009
Learning-by-doing: experience from 20 years of teaching LCA to future engineers

Purpose: In support of the sustainable development of our societies, future engineers should have elementary knowledge in sustainability assessment and use of life cycle assessment. Publications on pedagogical experience with teaching life cycle assessment (LCA) in high-level education are however scarce. Here, we describe and discuss 20 years of experience in teaching LCA at MSc level in an engineering university with the ambition to share our insights and inspire teaching of LCA as part of a university curriculum.

Methods: We detail the design of an LCA course taught at the Technical University of Denmark since 1997. The course structure relies on (i) a structured combination of theoretical teaching, practical assignments and hands-on practice on LCA case studies, and (ii) the conduct of real-life LCA case studies in collaboration with companies or other organisations. Through the semester-long duration of the course, students from different engineering backgrounds perform full-fledged LCA studies in groups, passing through two iterations—a screening LCA supporting a more targeted LCA.

Results and discussion: The course design, which relies on a learning-by-doing principle, is transparently described to inspire LCA teachers among the readers. Historical evolution and statistics about the course, including its 192 case studies run in collaboration with 105 companies and institutions, are analysed and serve as basis to discuss the benefits and challenges of its different components, such as the theory acquisition, the assignment work, the LCA software learning, the conduct of case studies, the merits of industrial collaborations and grading approaches.

Conclusions: We demonstrate the win-win situation created by the setting of the course, in which the
students are actively engaged and learn efficiently how to perform an LCA while the collaborating companies often get useful insights into their analysed case studies. The course can also be an eye opener for companies unfamiliar with LCA, who get introduced to life cycle thinking and the potential benefits of LCA. We have no hesitation in recommending industries and LCA teachers to engage into such collaborations even in the fundamental teaching of LCA techniques.

**General information**

State: Accepted/In press
Organisations: Quantitative Sustainability Assessment, Department of Management Engineering, Irstea
Contributors: Cosme, N. M. D., Hauschild, M. Z., Molin, C., Rosenbaum, R. K., Laurent, A.
Number of pages: 13
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Peer-reviewed: Yes

**Publication information**

Journal: International Journal of Life Cycle Assessment
ISSN (Print): 0948-3349
Ratings:
- BFI (2019): BFI-level 2
- Web of Science (2019): Indexed yes
- BFI (2018): BFI-level 2
- Web of Science (2018): Indexed yes
- BFI (2017): BFI-level 2
- Scopus rating (2017): CiteScore 3.71 SJR 1.268 SNIP 1.454
- Web of Science (2017): Impact factor 4.195
- Web of Science (2017): Indexed yes
- BFI (2016): BFI-level 2
- Scopus rating (2016): CiteScore 3.43 SJR 1.386 SNIP 1.517
- Web of Science (2016): Indexed yes
- BFI (2015): BFI-level 2
- Scopus rating (2015): CiteScore 3.49 SJR 1.53 SNIP 1.579
- Web of Science (2015): Indexed yes
- BFI (2014): BFI-level 2
- Scopus rating (2014): CiteScore 3.65 SJR 1.726 SNIP 1.78
- Web of Science (2014): Impact factor 3.988
- Web of Science (2014): Indexed yes
- BFI (2013): BFI-level 2
- Scopus rating (2013): CiteScore 3.35 SJR 1.672 SNIP 1.978
- Web of Science (2013): Impact factor 3.089
- ISI indexed (2013): ISI indexed yes
- Web of Science (2013): Indexed yes
- BFI (2012): BFI-level 2
- Scopus rating (2012): CiteScore 2.89 SJR 1.529 SNIP 1.707
- Web of Science (2012): Impact factor 2.773
- ISI indexed (2012): ISI indexed yes
- Web of Science (2012): Indexed yes
- BFI (2011): BFI-level 2
- Scopus rating (2011): CiteScore 2.82 SJR 1.595 SNIP 1.737
- Web of Science (2011): Impact factor 2.362
- ISI indexed (2011): ISI indexed yes
- Web of Science (2011): Indexed yes
- BFI (2010): BFI-level 2
- Scopus rating (2010): SJR 1.447 SNIP 1.826
- Web of Science (2010): Indexed yes
Experimental observation of fatigue degradation in a composite wind turbine blade

This study reports experimental observation of structural degradation in a composite wind turbine blade subject to fatigue loading. The fatigue test is carried out according to the test standard for the blade certification. The changes of bending stiffnesses, natural frequencies and damping ratios due to fatigue are examined and discussed. The study provides the first of this kind observation on full-scale composite rotor blades in the literature.

General information
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Organisations: Wind Turbine Structures and Component Design, Department of Wind Energy
Contributors: Chen, X.
Pages: 547-551
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Publication information
Journal: Composite Structures
Volume: 212
ISSN (Print): 0263-8223
Ratings:
BFI (2019): BFI-level 2
Web of Science (2019): Indexed yes
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Scopus rating (2017): CiteScore 4.52 SJR 1.905 SNIP 1.939
Web of Science (2017): Impact factor 4.101
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Volumetric reconstruction of acoustic energy flows in a reverberation room
This study examines the spatial and directional properties of net energy flows in a reverberation chamber. Based on measurements with a spherical array, a method is proposed to estimate the flows of acoustic energy in the volume surrounding the array. The proposed method is used to examine the steady state, early decay, and late decay of the sound field in a reverberation room (both empty and with an absorber on the floor). The results show that the approach is successful in characterizing the spatio-spectral and spatio-temporal properties of power flows in reverberant sound fields, constituting a valuable analysis tool.

General information
State: Published
Organisations: Acoustic Technology, Department of Electrical Engineering
Contributors: Nolan, M., Fernandez-Grande, E.
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Journal: Journal of the Acoustical Society of America
Volume: 145
Issue number: 3
ISSN (Print): 0001-4966
Ratings:
BFI (2019): BFI-level 2
Web of Science (2019): Indexed yes
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Scopus rating (2017): CiteScore 1.77 SJR 0.695 SNIP 1.224
Web of Science (2017): Impact factor 1.605
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 1.83 SJR 0.819 SNIP 1.271
Web of Science (2016): Impact factor 1.547
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): CiteScore 1.77 SJR 0.854 SNIP 1.416
Web of Science (2015): Impact factor 1.572
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): CiteScore 1.8 SJR 0.887 SNIP 1.402
Web of Science (2014): Impact factor 1.503
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): CiteScore 2 SJR 0.707 SNIP 1.937
Web of Science (2013): Impact factor 1.555
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): CiteScore 1.75 SJR 0.771 SNIP 1.619
Web of Science (2012): Impact factor 1.646
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): CiteScore 1.68 SJR 0.686 SNIP 1.624
Web of Science (2011): Impact factor 1.55
ISI indexed (2011): ISI indexed yes
Static and dynamic mode instabilities in dual-core fiber amplifiers
This paper provides a detailed derivation of coupled-mode equations for thermo-optic nonlinear effects in dual-core fiber amplifiers. The equations predict both static and dynamic modal deformations depending on amplifier design. The prediction of static deformations is confirmed by nonlinear beam-propagation simulations. The dependencies of instabilities and their thresholds on launch conditions are analyzed by numerical simulations and analytical arguments. It is shown that the output stability properties are strongly dependent on the relative phase of the input in the two cores. The instability power threshold for dual-core amplifiers with strongly coupled cores are found to be lower than for a comparable single-core amplifier. However, as the core separation is increased, the dual-core amplifier threshold rapidly increases when light is amplified in the odd supermode.

General information
State: Published
Organisations: Fiber Optics, Devices and Non-linear Effects, Department of Photonics Engineering, University of Parma
Contributors: Lægsgaard, J., Poli, F., Cucinotta, A., Selleri, S.
Pages: 757-767
Publication date: 1 Mar 2019
Peer-reviewed: Yes

Publication information
Journal: Journal of the Optical Society of America B: Optical Physics
Volume: 36
Issue number: 3
ISSN (Print): 0740-3224
Ratings:
BFI (2019): BFI-level 1
Web of Science (2019): Indexed yes
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 1.97 SJR 0.859 SNIP 0.875
Web of Science (2017): Impact factor 2.048
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 1.81 SJR 0.85 SNIP 0.936
Web of Science (2016): Impact factor 1.843
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 1.78 SJR 0.963 SNIP 0.923
Web of Science (2015): Impact factor 1.731
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 2.09 SJR 1.167 SNIP 1.137
Web of Science (2014): Impact factor 1.97
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 2.33 SJR 1.348 SNIP 1.286
Web of Science (2013): Impact factor 1.806
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 2.2 SJR 1.522 SNIP 1.28
Web of Science (2012): Impact factor 2.21
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): CiteScore 2.33 SJR 1.526 SNIP 1.499
Web of Science (2011): Impact factor 2.185
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 1.456 SNIP 1.352
Web of Science (2010): Impact factor 2.097
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 1.715 SNIP 1.595
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 1.62 SNIP 1.334
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 1.721 SNIP 1.326
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 1.65 SNIP 1.415
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 2.098 SNIP 1.676
Web of Science (2005): Indexed yes
Scopus rating (2004): SJR 2.018 SNIP 1.682
Web of Science (2004): Indexed yes
High-confinement gallium nitride-on-sapphire waveguides for integrated nonlinear photonics

We demonstrate a highly effective nonlinearity of $7.3 \text{ W}^{-1}\text{m}^{-1}$ in a high-confinement gallium nitride-on-sapphire waveguide by performing four-wave mixing characterization at telecom wavelengths. Benefitting from a high-index-contrast waveguide layout, we can engineer the device dispersion efficiently and achieve broadband four-wave mixing operation over more than 100 nm. The intrinsic material nonlinearity of gallium nitride is extracted. Furthermore, we fabricate microring resonators with quality factors above 100,000, which will be promising for various nonlinear applications.
Avoidable cancers in the Nordic countries—the potential impact of increased physical activity on postmenopausal breast, colon and endometrial cancer

Background: Physical activity has been shown to reduce the risk of colon, endometrial and postmenopausal breast cancer. The aim of this study was to quantify the proportion of the cancer burden in the Nordic countries linked to insufficient levels of leisure time physical activity and estimate the potential for cancer prevention for these three sites by increasing physical activity levels. Methods: Using the Prevent macrosimulation model, the number of cancer cases in the...
Nordic countries over a 30-year period (2016–2045) was modelled, under different scenarios of increasing physical activity levels in the population, and compared with the projected number of cases if constant physical activity prevailed. Physical activity (moderate and vigorous) was categorised according to metabolic equivalents (MET) hours in groups with sufficient physical activity (15+ MET-hours/week), low deficit (9 to <15 MET-hours/week), medium deficit (3 to <9 MET-hours/week) and high deficit (<3 MET-hours/week). Results: If no one had insufficient levels of physical activity, about 11,000 colon, endometrial and postmenopausal breast cancer cases could be avoided in the Nordic countries in a 30-year period, which is 1% of the expected cases for the three cancer types. With a 50% reduction in all deficit groups by 2025 or a 100% reduction in the group of high deficit, approximately 0.5% of the expected cases for the three cancer types could be avoided. The number and percentage of avoidable cases was highest for colon cancer. Conclusion: 11,000 cancer cases could be avoided in the Nordic countries in a 30-year period, if deficit in physical activity was eliminated.
Online adaptive clustering algorithm for load profiling

With the large-scale deployment of smart metering, energy sector is facing ‘Big Data’ related challenges. While metered customers generate streams of data, load profiling methods are not taking advantage of this structure. Indeed, insights on the demand are traditionally provided by static typical load profiles. Renewable energy sources generate intermittency in the production and subsequently uncertainty in aligning the generation to the demand at any time. This work proposes a new view on load profiling that takes benefit of the stream structure of the data, an adaptive and recursive clustering method that generates typical load profiles updated to newly collected data. The online adaptive clustering algorithm is based on an online K-means approach using a dynamic time warping based distance associated with a facility location to adjust the number of typical load profiles. The performance of the algorithm is evaluated on a synthetic dataset and applications are presented on real-world dataset from both electricity and central district heating.

General information

State: Published
Organisations: Energy Analytics and Markets, Center for Electric Power and Energy, Department of Electrical Engineering
Contributors: Le Ray, G., Pinson, P.
Number of pages: 9
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Publication information

Journal: Sustainable Energy, Grids and Networks
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Article number: 100181
ISSN (Print): 2352-4677
Ratings:
Web of Science (2019): Indexed yes
Web of Science (2018): Indexed yes
Scopus rating (2017): CiteScore 2.76 SJR 0.769 SNIP 0.841
Web of Science (2017): Indexed yes
Scopus rating (2016): CiteScore 2.33 SJR 0.604 SNIP 1.394
Web of Science (2016): Indexed yes
Original language: English
Keywords: Clustering, Load profiling, Smart grid, Time-series analysis
DOIs:
10.1016/j.segan.2018.100181
Vorticity topology of vortex pair interactions at low Reynolds numbers

We investigate vortex merging at low Reynolds numbers from a topological point of view. We identify vortices as local extremal points of vorticity and follow the motion and bifurcation of these points as time progresses. We consider both two-dimensional simulations of the vorticity transport equation and an analytical study of the core growth model. The merging process of identical vortices is shown to occur through a pitchfork bifurcation and for asymmetric vortices one vortex merges with a saddle through a cusp (perturbed pitchfork) bifurcation. Excellent agreement between the core growth model and the numerical simulations is observed. For higher Reynolds numbers, filamentation becomes dominant hence limiting the predictive value of the core growth model. A complete investigation of merging in the core growth model is conducted for all possible vortex strengths. Simple, analytical expressions are derived for bifurcation curves, merging time, and vortex positions depending on systems parameters.

General information

State: Published
Organisations: Department of Applied Mathematics and Computer Science, Mathematics, Roskilde University, Ecole Nationale Supérieure de Mécanique et Aérotechnique
Contributors: Andersen, M., Schreck, C., Hansen, J. S., Brøns, M.
Pages: 58-67
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Peer-reviewed: Yes

Publication information

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Volume: 74
ISSN (Print): 0997-7546
Ratings:
- BFI (2019): BFI-level 2
- Web of Science (2019): Indexed yes
- BFI (2018): BFI-level 2
- Web of Science (2018): Indexed yes
- BFI (2017): BFI-level 1
- Scopus rating (2017): CiteScore 2.14 SJR 0.726 SNIP 1.36
- Web of Science (2017): Impact factor 1.984
- Web of Science (2017): Indexed yes
- BFI (2016): BFI-level 1
- Scopus rating (2016): CiteScore 2.07 SJR 0.806 SNIP 1.414
- Web of Science (2016): Impact factor 1.969
- Web of Science (2016): Indexed yes
- BFI (2015): BFI-level 1
- Scopus rating (2015): CiteScore 1.75 SJR 0.8 SNIP 1.444
- Web of Science (2015): Impact factor 1.418
- BFI (2014): BFI-level 1
- Scopus rating (2014): CiteScore 1.8 SJR 0.788 SNIP 1.57
- Web of Science (2014): Impact factor 1.656
- BFI (2013): BFI-level 1
- Scopus rating (2013): CiteScore 1.79 SJR 0.847 SNIP 1.538
- Web of Science (2013): Impact factor 1.545
- ISI indexed (2013): ISI indexed yes
- BFI (2012): BFI-level 1
- Scopus rating (2012): CiteScore 1.86 SJR 0.934 SNIP 1.609
- Web of Science (2012): Impact factor 1.635
- ISI indexed (2012): ISI indexed yes
- Web of Science (2012): Indexed yes
- BFI (2011): BFI-level 1
- Scopus rating (2011): CiteScore 1.61 SJR 0.712 SNIP 1.475
Automated workflow composition in mass spectrometry-based proteomics

Numerous software utilities operating on mass spectrometry (MS) data are described in the literature and provide specific operations as building blocks for the assembly of on-purpose workflows. Working out which tools and combinations are applicable or optimal in practice is often hard. Thus researchers face difficulties in selecting practical and effective data analysis pipelines for a specific experimental design. Results: We provide a toolkit to support researchers in identifying, comparing and benchmarking multiple workflows from individual bioinformatics tools. Automated workflow composition is enabled by the tools' semantic annotation in terms of the EDAM ontology. To demonstrate the practical use of our framework, we created and evaluated a number of logically and semantically equivalent workflows for four use cases representing frequent tasks in MS-based proteomics. Indeed we found that the results computed by the workflows could vary considerably, emphasizing the benefits of a framework that facilitates their systematic exploration.

General information
State: Published
Organisations: IT Service, Leiden University, Utrecht University, University of Southern Denmark
Contributors: Palmblad, M., Lamprecht, A. L., Ison, J., Schwämmle, V.
Pages: 656-664
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Journal: Bioinformatics
Volume: 35
Issue number: 4
ISSN (Print): 1367-4803
Ratings:
Web of Science (2019): Indexed yes
Web of Science (2018): Indexed yes
Scopus rating (2017): CiteScore 7.84
Web of Science (2017): Impact factor 5.481
Web of Science (2017): Indexed yes
Scopus rating (2016): CiteScore 6.42
Fast and large-area fabrication of plasmonic reflection color filters by achromatic Talbot lithography

To overcome the limits of traditional technologies, which cannot achieve high resolution and high throughput simultaneously, here we propose, to the best of our knowledge, a novel method, i.e., achromatic Talbot lithography, to fabricate large-area nanopatterns fast and precisely. We successfully demonstrate reflection color filters with a maximum size of about 0.72 × 0.72 mm^2 with a time of only 20 s that have colors similar to simulations and small-area devices fabricated by electron beam lithography. These results indicate the possibility of large-scale fabrication of plasmonic color filters with high resolution efficiently by the achromatic Talbot lithography method.

General information
State: Published
Organisations: Department of Photonics Engineering, Structured Electromagnetic Materials, Zhejiang University, Chinese Academy of Sciences
Pages: 1031-1034
Publication date: 15 Feb 2019
Suspicious emails are one big threat for Internet of Things (IoT) security, which aim to induce users to click and then redirect them to a phishing webpage. To protect IoT systems, email classification is an essential mechanism to classify spam and legitimate emails. In the literature, most email classification approaches adopt supervised learning algorithms that require a large number of labeled data for classifier training. However, data labeling is very time consuming and expensive, making only a very small set of data available in practice, which would greatly degrade the effectiveness of email classification. To mitigate this problem, in this work, we develop an email classification approach based on multi-view disagreement-based semi-supervised learning. The idea behind is that multi-view method can offer richer information for classification, which is often ignored by the literature. The use of semi-supervised learning can help leverage both labeled and unlabeled data. In the evaluation, we investigate the performance of our proposed approach with two datasets and in a real network environment. Experimental results demonstrate that the use of multi-view data can achieve more accurate email classification than the use of single-view data, and that our approach is more effective as compared to several existing similar algorithms.
The quality of electricity system modelling heavily depends on the input data used. Although a lot of data is publicly available, it is often dispersed, tedious to process and partly contains errors. We argue that a central provision of input data for modelling has the character of a public good: it reduces overall societal costs for quantitative energy research as redundant work is avoided, and it improves transparency and reproducibility in electricity system modelling. This paper describes the Open Power System Data platform that aims at realising the efficiency and quality gains of centralised data provision by collecting, checking, processing, aggregating, documenting and publishing data required by most modellers. We conclude that the platform can provide substantial benefits to energy system analysis by raising efficiency of data pre-processing, providing a method for making data pre-processing for energy system modelling traceable, flexible and reproducible and improving the quality of original data published by data providers.

Open Power System Data: Frictionless data for electricity system modelling
The quality of electricity system modelling heavily depends on the input data used. Although a lot of data is publicly available, it is often dispersed, tedious to process and partly contains errors. We argue that a central provision of input data for modelling has the character of a public good: it reduces overall societal costs for quantitative energy research as redundant work is avoided, and it improves transparency and reproducibility in electricity system modelling. This paper describes the Open Power System Data platform that aims at realising the efficiency and quality gains of centralised data provision by collecting, checking, processing, aggregating, documenting and publishing data required by most modellers. We conclude that the platform can provide substantial benefits to energy system analysis by raising efficiency of data pre-processing, providing a method for making data pre-processing for energy system modelling traceable, flexible and reproducible and improving the quality of original data published by data providers.

General information
State: Published
Organisations: Technical University of Denmark, Department of Management Engineering, Systems Analysis, University of Basel, University of Flensburg, Technical University of Berlin, Hertie School of Governance, Tennet TSB B.V., Humboldt University of Berlin, Neon Neue Energieökonomik GmbH, German Institute for Economic Research
Commentary: Transcranial stimulation of the frontal lobes increases propensity of mind-wandering without changing meta-awareness

General information
State: Published
Organisations: Department of Electrical Engineering, Department of Health Technology, Center for Magnetic Resonance, UiT The Arctic University of Norway, University of Göttingen, University of Newcastle, University of Minnesota, Danish Research Centre for Magnetic Resonance, University of Amsterdam
Number of pages: 3
Publication date: 5 Feb 2019
Peer-reviewed: Yes
Real-time interferometric refractive index change measurement for the direct detection of enzymatic reactions and the determination of enzyme kinetics

Back scatter interferometry (BSI) is a sensitive method for detecting changes in the bulk refractive index of a solution in a microfluidic system. Here we demonstrate that BSI can be used to directly detect enzymatic reactions and, for the first time, derive kinetic parameters. While many methods in biomedical assays rely on detectable biproducts to produce a signal, direct detection is possible if the substrate or the product exert distinct differences in their specific refractive index so that the total refractive index changes during the enzymatic reaction. In this study, both the conversion of glucose to glucose-6-phosphate, catalyzed by hexokinase, and the conversion of adenosine-triphosphate to adenosine di-phosphate and mono-phosphate, catalyzed by apyrase, were monitored by BSI. When adding hexokinase to glucose solutions containing adenosine-triphosphate, the conversion can be directly followed by BSI, which shows the increasing refractive index and a final plateau corresponding to the particular concentration. From the initial reaction velocities, $K_M$ was found to be 0.33 mM using Michaelis–Menten kinetics. The experiments with apyrase indicate that the refractive index also depends on the presence of various ions that must be taken into account when using this technique. This study clearly demonstrates that measuring changes in the refractive index can be used for the direct determination of substrate concentrations and enzyme kinetics.

General information
State: Published
Organisations: Statistics and Data Analysis, Department of Applied Mathematics and Computer Science, Department of Photonics Engineering, Aalborg University
Contributors: Jepsen, S. T., Jørgensen, T. M., Sørensen, H. S., Kristensen, S. R.
Number of pages: 8
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Journal: Sensors (Switzerland)
Volume: 19
Issue number: 3
Article number: 539
ISSN (Print): 1424-8220
Ratings:
BFI (2019): BFI-level 2
Web of Science (2019): Indexed yes
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Scopus rating (2017): CiteScore 3.23 SJR 0.584 SNIP 1.55
Web of Science (2017): Impact factor 2.475
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 2.78 SJR 0.623 SNIP 1.614
Web of Science (2016): Impact factor 2.677
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): CiteScore 2.21 SJR 0.647 SNIP 1.643
Web of Science (2015): Impact factor 2.033
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): CiteScore 2.4 SJR 0.707 SNIP 1.796
Web of Science (2014): Impact factor 2.245
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): CiteScore 2.72 SJR 0.636 SNIP 1.758
Web of Science (2013): Impact factor 2.048
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): CiteScore 2.53 SJR 0.671 SNIP 1.709
Web of Science (2012): Impact factor 1.953
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
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BFI (2009): BFI-level 1
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Web of Science (2009): Indexed yes
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The impact of noise power estimation on speech intelligibility in cochlear-implant speech coding strategies

The advanced combination encoder (ACE™) is an established speech-coding strategy in cochlear-implant processing that selects a number of frequency channels based on amplitudes. However, speech intelligibility outcomes with this strategy are limited in noisy conditions. To improve speech intelligibility, either noise-dominant channels can be attenuated prior to ACE™ with noise reduction or, alternatively, channels can be selected based on estimated signal-to-noise ratios. A noise power estimation stage is, therefore, required. This study investigated the impact of noise power estimation in noise-reduction and channel-selection strategies. Results imply that estimation with improved noise-tracking capabilities does not necessarily translate into increased speech intelligibility.

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ISI indexed (2013): ISI indexed yes
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Effect of Noise Reduction Gain Errors on Simulated Cochlear Implant Speech Intelligibility

It has been suggested that the most important factor for obtaining high speech intelligibility in noise with cochlear implant (CI) recipients is to preserve the low-frequency amplitude modulations of speech across time and frequency by, for example, minimizing the amount of noise in the gaps between speech segments. In contrast, it has also been argued that the transient parts of the speech signal, such as speech onsets, provide the most important information for speech intelligibility. The present study investigated the relative impact of these two factors on the potential benefit of noise reduction for CI recipients by systematically introducing noise estimation errors within speech segments, speech gaps, and the transitions between them. The introduction of these noise estimation errors directly induces errors in the noise reduction gains within each of these regions. Speech intelligibility in both stationary and modulated noise was then measured using a CI simulation tested on normal-hearing listeners. The results suggest that minimizing noise in the speech gaps can improve intelligibility, at least in modulated noise. However, significantly larger improvements were obtained when both the noise in the gaps was minimized and the speech transients were preserved. These results imply that the ability to identify the boundaries between speech segments and speech gaps may be one of the most important factors for a noise reduction algorithm because knowing the boundaries makes it possible to minimize the noise in the gaps as well as enhance the low-frequency amplitude modulations of the speech.
Deriving Environmental Life Cycle Inventory Factors for Land Application of Garden Waste Products Under Northern European Conditions

The amount of waste which is being recycled is increasing in Europe. Garden waste is increasingly composted and land applied. However, composting to full maturity requires resources in terms of space, equipment and labour. Alternatives could include a simple shredding, or composting for a shorter time. Finally, an option could be to remove trunks and large branches which are not easy to compost and incinerate them to recover energy. In order to assess these options and the associated environmental impacts, it is necessary to have good estimates of emissions and other inventory factors during the different steps of the life cycle of the compost products. Especially, the impacts occurring after land application are difficult to estimate. The objective of the current paper is to estimate environmental inventory factors for land application of four garden waste products: shredded garden waste, shredded garden waste after removal of the woody fraction, immature garden waste compost and mature garden waste compost. Soil incubations of the materials were conducted in order to assess the carbon (C) and nitrogen (N) dynamics occurring after incorporation in soil. Subsequently, the results were used to calibrate the mineralisation kinetics of the materials in the agroecosystem model Daisy. Subsequently, the model was used to simulate C and N dynamics under different environmental conditions and emissions to the environment and used to derive inventory factors. Nine soil and climate combinations were included in the simulation study to cover local conditions commonly found in Northern Europe. The degradability of the garden waste products increased when the woody fraction of garden waste was removed and generally the degradability of the product was decreased by composting. All four products showed initial immobilisation of N in soil, but it was clear that removal of the woody fraction and composting reduced the length and severity of the immobilisation phase. The approach taken in the current paper using soil incubations to estimate decomposition parameters for the materials and subsequently an agroecosystem model to extrapolate the observations proved efficient at estimating inventory factors under various environmental conditions and fertilisation levels. Under low N availability conditions, the harvest factor, which estimates the fraction of N harvested in
response to application of an amount of compost ranged between 0.10 and 0.18 for a sandy loam soil and medium precipitation conditions for Northern European while it ranged from negative values to 0.12 under conditions of ample N supply. These results were also clearly reflected in the emission factors for N leaching to the groundwater and losses to surface water, which were higher under high N availability than under low. The harvest factor, emission factors for ammonia, N leaching to ground water and loss to surface water proved to be very dependent on the local conditions like the soil type, precipitation regime and general fertilisation level, whereas the biochemical composition of the materials was of less importance for these factors. In contrast, the C sequestration factor was almost unaffected by the environmental conditions but depended to a large extent on the degradability of the added material.

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- BFI (2016): BFI-level 1
- Scopus rating (2016): CiteScore 1 SJR 0.353 SNIP 0.64
- Web of Science (2016): Impact factor 1.023
- Web of Science (2016): Indexed yes
- BFI (2015): BFI-level 1
- Scopus rating (2015): CiteScore 1.2 SJR 0.523 SNIP 0.875
- BFI (2014): BFI-level 1
- Scopus rating (2014): CiteScore 1.16 SJR 0.522 SNIP 0.918
- Web of Science (2014): Impact factor 0.98
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- Web of Science (2013): Impact factor 1.074
- ISI indexed (2013): ISI indexed yes
- BFI (2012): BFI-level 1
- Scopus rating (2012): CiteScore 1.13 SJR 0.46 SNIP 0.789
- Web of Science (2012): Impact factor 0.977
- ISI indexed (2012): ISI indexed yes
- Web of Science (2012): Indexed yes
- BFI (2011): BFI-level 1
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- BFI (2010): BFI-level 1
- Scopus rating (2010): SJR 0.383 SNIP 0.812
- Web of Science (2010): Impact factor 0.916
A next generation sequencing approach for targeted Varroa destructor (Acari: Varroidae) mitochondrial DNA analysis based on honey derived environmental DNA

Honey contains DNA from many different organisms that are part of hive micro-environmental niches and honey bee pathospheres. In this study, we recovered and sequenced mite mitochondrial DNA (mtDNA) from honey from different locations around the world (Europe, Asia, Africa, North and South America). DNA extracted from 17 honey samples was amplified with eight primer pairs targeting three mite mtDNA genes, obtaining 88 amplicons that were sequenced with an Ion Torrent sequencing platform. A bioinformatic pipeline compared produced reads with Varroa spp. mtDNA sequence entries available in GenBank and assigned them to different mitotypes. In all honey samples, the highest percentage of reads was attributed to the K1 lineage, including a few variants derived from it, in addition to J1 reads observed in the two South American samples and C1-1 reads obtained from the Chinese honey. This study opens new possibilities to analyse mite lineages and variants and monitor their geographical and temporal distribution, simplifying surveillance against this damaging honey bee parasite.

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Microalgae and cyanobacteria modeling in water resource recovery facilities: A critical review

Microalgal and cyanobacterial resource recovery systems could significantly advance nutrient recovery from wastewater by achieving effluent nitrogen (N) and phosphorus (P) levels below the current limit of technology. The successful implementation of phytoplankton, however, requires the formulation of process models that balance fidelity and simplicity to accurately simulate dynamic performance in response to environmental conditions. This work synthesizes the range of model structures that have been leveraged for algae and cyanobacteria modeling and core model features that are required to enable reliable process modeling in the context of water resource recovery facilities. Results from an extensive literature review of over 300 published phytoplankton models are presented, with particular attention to similarities with and differences from existing strategies to model chemotrophic wastewater treatment processes (e.g., via the Activated Sludge Models, ASMs). Building on published process models, the core requirements of a model structure for algal and cyanobacterial processes are presented, including detailed recommendations for the prediction of growth (under phototrophic, heterotrophic, and mixotrophic conditions), nutrient uptake, carbon uptake and storage, and respiration.

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