Effects of Exposure to Carbon Dioxide and Bioeffluents on Perceived Air Quality, Self-assessed Acute Health Symptoms and Cognitive Performance

The purpose of this study was to examine the effects on humans of exposure to carbon dioxide (CO₂) and bioeffluents. In three of the five exposures, the outdoor air supply rate was high enough to remove bioeffluents, resulting in a CO₂ level of 500 ppm. Chemically pure CO₂ was added to this reference condition to create exposure conditions with CO₂ at 1,000 ppm or 3,000 ppm. In two further conditions, the outdoor air supply rate was restricted so that the bioeffluent CO₂ reached 1,000 ppm or 3,000 ppm. The same twenty-five subjects were exposed for 255 minutes to each condition. Subjective ratings, physiological responses and cognitive performance were measured. No statistically significant effects on perceived air quality, acute health symptoms or cognitive performance were seen during exposures when CO₂ was added. Exposures to bioeffluents with CO₂ at 3,000 ppm reduced perceived air quality, increased the intensity of reported headache, fatigue, sleepiness and difficulty in thinking clearly, and reduced speed of addition, the response time in a redirection task and the number of correct links made in the cue-utilisation test. This suggests that moderate concentrations of bioeffluents, but not pure CO₂, will result in deleterious effects on occupants during typical indoor exposures.
Scopus rating (2014): CiteScore 4.57
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 3.63
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 2.72
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): CiteScore 2.42
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 2
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 2
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 0.757 SNIP 2.168
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 0.933 SNIP 3.724
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 0.637 SNIP 2.622
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 0.347 SNIP 1.283
Web of Science (2005): Indexed yes
Web of Science (2004): Indexed yes
Web of Science (2003): Indexed yes
Web of Science (2002): Indexed yes
Web of Science (2001): Indexed yes
Web of Science (2000): Indexed yes
Original language: English
Carbon dioxide, Human bioeffluents, Acute health symptoms, Perceived air quality, Cognitive performance, Subjective responses
Electronic versions:
ina12284.pdf
DOIs:
10.1111/ina.12284
Source: FindIt
Source-ID: 2291716698
Publication: Research - peer-review › Journal article – Annual report year: 2016

Lederlønsundersøgelse - Lønberegner til BUPL

General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science, Statistics and Data Analysis
Authors: Andersen, J. F. (Intern), Thyregod, C. (Intern), Erbsøll, B. K. (Intern)
Number of pages: 8
Publication date: 2017

Publication information
Publisher: DTU Compute
Original language: English

Outlier Detection in End-User Performance Monitoring - Smart Innovation.

General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science, Statistics and Data Analysis
Authors: Andersen, J. F. (Intern), Stockmarr, A. (Intern), Thyregod, C. (Intern), Erbsøll, B. K. (Intern)
Publication date: 2017

Publication information
Publisher: Technical University of Denmark (DTU)
Original language: English
Volume: 07
ISSN: 1601-2321
Main Research Area: Technical/natural sciences
Publication: Research › Report – Annual report year: 2017

Simulering af Lokalebehov i 2025

General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science, Statistics and Data Analysis
Authors: Andersen, J. F. (Intern), Erbsøll, B. K. (Intern), Thyregod, C. (Intern)
Number of pages: 22
Publication date: 2017

Publication information
Publisher: DTU Compute
Original language: English
Volume: 10
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Main Research Area: Technical/natural sciences
Publication: Research › Report – Annual report year: 2017

Lederundersøgelse - Lønberegning

General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science, Statistics and Data Analysis
Authors: Thyregod, C. (Intern), Erbsøll, B. K. (Intern)
Number of pages: 8
Publication date: 2016

Publication information
Original language: Danish
Main Research Area: Technical/natural sciences
Publication: Research › Report – Annual report year: 2016

Parking guidance: Summary report

General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science, Statistics and Data Analysis, Technical University of Denmark
Authors: Thyregod, C. (Intern), Notarangelo, R. (Ekstern), Erbsøll, B. K. (Intern)
Analysis of data from the MariCare Smartfloor at Skovhuset Care Home

In this project data is analysed from a smartfloor which is installed in an elderly care home. Two lines of investigation are carried out. The first uses "event data" from the smartfloor. This data contains every event (bathroom visits, people entering/exiting the room etc.) registered by the floor over a one year period. Control charts are used to investigate a link between the event data and UTI incidence. A clear predictor for UTI is not found, but the value of control charts in this setting is demonstrated. In the second line of investigation "position data" is analysed. The position data is more limited than the event data in that it is extracted manually using image analysis on the smartfloor user interface program. Using the position data, the trajectories traced by a resident moving about their room are visualised and properties such as direction and speed are investigated. A method is found for comparison of trajectories to determine their degree of similarity and this method can identify unusual trajectories in the dataset.
Class 4 Defects

General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science, Statistics and Data Analysis
Authors: Andersen, E. W. (Intern), Thyregod, C. (Intern), Kulahci, M. (Intern), Ersbøll, B. K. (Intern)
Number of pages: 140
Publication date: 2013

Publication information
Place of publication: Kgs. Lyngby
Publisher: Technical University of Denmark (DTU)
Original language: English
Series: DTU Compute-Technical Report-2013
Number: 23
ISSN: 1601-2321
Main Research Area: Technical/natural sciences
Publication: Research › Report – Annual report year: 2013

Improvement of the ΔH Model

General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science, Statistics and Data Analysis
Authors: Thyregod, C. (Intern), Andersen, E. W. (Intern), Kulahci, M. (Intern), Ersbøll, B. K. (Intern)
Number of pages: 29
Publication date: 2013

Publication information
Place of publication: Kgs. Lyngby
Publisher: Technical University of Denmark (DTU)
Original language: English
Series: DTU Compute-Technical Report-2013
Number: 22
ISSN: 1601-2321
Main Research Area: Technical/natural sciences
Publication: Research › Report – Annual report year: 2013

Basal insulin analogues in diabetic pregnancy: a literature review and baseline results of a randomised, controlled trial in type 1 diabetes

As basal insulin analogues are being used off-label, there is a need to evaluate their safety (maternal hypoglycaemia and fetal and perinatal outcomes) and efficacy [haemoglobin A$_{\text{1C}}$ (HbA$_{\text{1C}}$), fasting plasma glucose, and maternal weight gain]. The aim of this review is to provide an overview of the current literature concerning basal insulin analogue use in diabetic pregnancy, and to present the design and preliminary, non-validated baseline characteristics of a currently ongoing randomized, controlled, open-label, multicentre, multinational trial comparing insulin detemir with neutral protamine hagedorn insulin, both with insulin aspart, in women with type 1 diabetes planning a pregnancy (n = 306) or are already pregnant (n = 164). Inclusion criteria include type 1 diabetes > 12 months’ duration; screening HbA$_{\text{1C}}$ $\leq$ 9.0% (women recruited prepregnancy), or pregnant with gestational age 8–12 weeks and HbA$_{\text{1C}}$ $\leq$ 8.0% at randomization. Subjects are randomized to either insulin detemir or neutral protamine hagedorn insulin, both with prandial insulin aspart. The results are expected mid-2011 with full publications expected later this year. Baseline characteristics show that basal insulin analogues are already frequently used in pregnant women with type 1 diabetes. This study will hopefully elucidate the safety and efficacy of the basal insulin analogue detemir in diabetic pregnancy. Copyright © 2011 John Wiley & Sons, Ltd.

General information
State: Published
Organisations: Sansum Diabetes Research Institute, Royal Victoria Hospital, Novo Nordisk A/S, Tel Aviv University, Copenhagen University Hospital
Authors: Mathiesen, E. R. (Ekstern), Damm, P. (Forskerdatabase), Jovanovic, L. (Ekstern), McCance, D. R. (Ekstern), Thyregod, C. (Intern), Jensen, A. B. (Ekstern), Hod, M. (Ekstern)
Using Estimated Values of Capability Indices for Batch Acceptance
Statistical methods for assessment of blend homogeneity

In this thesis the use of various statistical methods to address some of the problems related to assessment of the homogeneity of powder blends in tablet production is discussed. It is not straightforward to assess the homogeneity of a powder blend. The reason is partly that in bulk materials as powder blends there is no natural unit or amount to define a sample from the blend, and partly that current technology does not provide a method of universally collecting small representative samples from large static powder beds. In the thesis a number of methods to assess (in)homogeneity are presented. Some methods have a focus on exploratory analysis where the aim is to investigate the spatial distribution of drug content in the batch. Other methods presented focus on describing the overall (total) (in)homogeneity of the blend. The overall (in)homogeneity of the blend is relevant as it is closely related to the (in)homogeneity of the tablets and therefore critical for the end users of the product. Methods to evaluate external factors, that may have an influence on the content in blend samples, as e.g. sampling device, have been presented. However, the content in samples is also affected of internal factors to the blend e.g. the particle size distribution. The relation between particle size distribution and the variation in drug content in blend and tablet samples is discussed. A central problem is to develop acceptance criteria for blends and tablet batches to decide whether the blend or batch is sufficiently homogeneous (uniform) to meet the need of the end users. Such criteria are most often criteria regarding sample values rather than criteria for the quality (homogeneity) of the blend or tablet batch. This inherently leads to uncertainty regarding the true quality of a specific blend or batch. In the thesis it is shown how to link sampling result and acceptance criteria to the actual quality (homogeneity) of the blend or tablet batch. Also it is discussed how the assurance related to a specific acceptance criteria can be obtained from the corresponding OC-curve. Further, it is shown how to set up parametric acceptance criteria for the batch that gives a high confidence that future samples with a probability larger than a specified value will pass the USP threeclass criteria. Properties and robustness of proposed changes to the USP test for content uniformity are investigated by the use of simulations, and single sampling acceptance plans for inspection by variables that aim at matching the USP proposal have been suggested.
Projects:

Smart innovation - Learningbank: Learning using VR
Digital Learning
Department of Applied Mathematics and Computer Science
Statistics and Data Analysis

Learningbank
Period: 01/09/2017 → …
Number of participants: 2
Project participant:
Thyregod, Camilla (Intern)
Project Manager, academic:
Rootzén, Helle (Intern)

Strengthen ISS Global A/S before negotiations through data analysis on Fleet LSI data
Department of Applied Mathematics and Computer Science
Statistics and Data Analysis

Period: 01/01/2017 → 06/07/2017
Number of participants: 3
Other:
Samsøe, Pernille Lindvang (Ekstern)
Supervisor:
Thyregod, Camilla (Intern)
Main Supervisor:
Rootzén, Helle (Intern)

Visualization, Analysis and Modelling of On-street Parking Data
Master project
Department of Applied Mathematics and Computer Science
Statistics and Data Analysis

EasyPark
Period: 01/04/2016 → 28/09/2016
Number of participants: 3
Project participant:
Notarangelo, Rosaria (Ekstern)
Supervisor:
Thyregod, Camilla (Intern)
Main Supervisor:
Ersbøll, Bjarne Kjær (Intern)

Optimisation of biodevice production
Master project
Intelligent Quality Assessment of Railway Switches and Crossings

This project aims at significantly improving the safety, reliability and operational lifetime of the 3500 switches and crossings (S&Cs) in the Danish railway network. The project is a close cooperation between the Technical University of Denmark (DTU), the Danish rail infrastructure provider Rail Net Denmark and four affiliated European partners with significant expertise within this field. An inter-disciplinary scientific effort is employed to obtain enhanced rail transport reliability and regularity simultaneously with significant savings in S&Cs maintenance costs. The project results will make maintenance based on intelligent fault prediction tools, instead of the presently used regular planned inspections, and it will provide sophisticated tools to prevent hidden faults from developing to failure in the future. In a novel approach, the project will install state-of-the-art sensor technology in selected S&Cs and correlate dynamic parameters during train passage with static geometry data from conventional measurement vehicles. Monitoring of the dynamic responses will provide diagnosis of patterns that indicate when components or ballast begin to deviate from fully functional conditions. Modelling of dynamics will identify root causes to signs of degradation. Damage assessment of components identified by anomalous readings will be done by metallurgical examinations. Data and results will be processed by a holistic model that can produce Maintenance Performance Indicators (MPI) for the S&C condition. The correlation of sensor data to measuring vehicle data will allow existing data to be used reliably as input for the MPI model. It is expected that this project will enable optimisation of maintenance procedures, by which appropriate maintenance can be predicted in advance, thus avoiding unscheduled repairs and delays in the railway traffic.
**Intelligent Quality Assessment of Railway Switches and Crossings (INTELLISWITCH)**

Department of Electrical Engineering

Department of Mechanical Engineering

Department of Applied Mathematics and Computer Science

Statistics and Data Analysis

Department of Wind Energy

Materials science and characterization

Banedanmark

**Period:** 01/03/2015 → 31/12/2019

**Number of participants:** 3

**Project participant:**

Thyregod, Camilla (Intern)

Ersbøll, Bjarne Kjær (Intern)

**Project Manager, organisational:**

Juul Jensen, Dorte (Intern)

**Financing sources**

Source: Public research council

Name of research programme: Innovationsfonden

Web address: [http://innovationsfonden.dk/da](http://innovationsfonden.dk/da)

Amount: 12,700,000.00 Danish Kroner

Year of approval: 2014

**Project**

**Smart Innovation: Parking Guidance**

Department of Applied Mathematics and Computer Science

Statistics and Data Analysis

EasyPark

**DTU Scion**

**Period:** 01/01/2015 → 31/10/2016

**Number of participants:** 2

**Project participant:**

Thyregod, Camilla (Intern)

Ersbøll, Bjarne Kjær (Intern)

**Project Manager, organisational:**

Juul Jensen, Dorte (Intern)

**Financing sources**

Source: Public research council

Name of research programme: Innovation Fund Denmark

Amount: 12.70 Danish Kroner

**Project**

**Metoder til validering af prøvetagningsmetoder for bulkmaterialer**

Department of Informatics and Mathematical Modeling

**Period:** 01/01/1999 → …

**Number of participants:** 8

Phd Student:
Thyregod, Camilla (Intern)
Supervisor:
Grønlund, Per (Ekstern)
Iwersen, Jørgen (Ekstern)
Tvermoes, Charlotte (Ekstern)
Main Supervisor:
Thyregod, Poul (Intern)
Examiner:
Rootzén, Helle (Intern)
Kristensen, Henning Gjelstrup (Ekstern)
Windfeld, Kristian (Ekstern)

Financing sources
Source: Internal funding (public)
Name of research programme: Erhvervsforskerordningen
Project: PhD

Statistical methods for assessment of blend homogeneity
ph.d. project financed by the Danish Academy of Technical Sciences (ATV) and Novonordisk A/S. The purpose of the project is to discuss acceptance criteria for blend and tablet batches in pharmaceutical production.

Department of Informatics and Mathematical Modeling
Novo Nordisk A/S
Period: 01/01/1999 → 31/12/2002
Number of participants: 5
Project participant:
Thyregod, Camilla (Intern)
Iwersen, Jørgen (Ekstern)
Grøvenlund, Per (Ekstern)
Tvermoes Rezai, Charlotte (Ekstern)
Project Manager, organisational:
Thyregod, Poul (Intern)

Activities:

Introduction to Applied Statistics with R for PhD Students
Period: 9 Jun 2017 → 30 Jun 2017
Anders Stockmarr (Lecturer)
Bjarne Kjaer Ersbøll (Lecturer)
Elisabeth Wreford Andersen (Guest lecturer)
Murat Kulahci (Lecturer)
Andreas Baum (Lecturer)
Camilla Thyregod (Other)
Jesper Fink Andersen (Other)

Department of Applied Mathematics and Computer Science
Statistics and Data Analysis

Related organisation

Introduction to Applied Statistics with R for PhD Students
Stockmarr, A. (Lecturer), Ersbøll, B. K. (Lecturer), Andersen, E. W. (Guest lecturer), Kulahci, M. (Lecturer), Baum, A. (Lecturer), Thyregod, C. (Other), Andersen, J. F. (Other)
9 Jun 2017 → 30 Jun 2017
Activity: Talks and presentations › Guest lectures, external teaching and course activities at other universities
02411 Statistical Design and Analysis of Experiments
Period: 1 Sep 2015 → 31 Aug 2016
Camilla Thyregod (Lecturer)
Department of Applied Mathematics and Computer Science
Statistics and Data Analysis

Description
Course lecturer

Related organisation

02411 Statistical Design and Analysis of Experiments
Thyregod, C. (Lecturer)
1 Sep 2015 → 31 Aug 2016
Activity: Other

Design of Experiments
Period: Sep 2013 → …
Camilla Thyregod (Lecturer)
Department of Applied Mathematics and Computer Science
Statistics and Data Analysis

Description
3 day course
Activity: Other