Table of Contents

1. Dynamic Train Rescheduling using Alternating Algorithms .........................................................1
   Linsha Dai, Gemma L. Nicholson, David Kirkwood, Clive Roberts
   The University of Birmingham

2. Real-time decision-support algorithms to optimize train order at junctions .........................8
   François Ramond, Adrien Boillot, Nicolas Marcos
   SNCF - Innovation & Research

3. Optimal train scheduling under a flexible skip-stop scheme for urban rail transit based on smartcard data ..........................................................................................................................13
   Peitong Zhang¹, Xiaobo Liu¹, Mei Chen²
   ¹Southwest Jiaotong University
   ²University of Kentucky

4. Train Trajectory Optimization of Opposite Trains on Single-Track Railway Lines ...................23
   Pengling Wang, Rob M.P. Goverde
   Southwest Jiaotong University

5. Supervision and rescheduling of a mixed CBTC traffic on a suburban railway line .............32
   Juliette Pochet¹, Sylvain Baro¹, Guillaume Sandou²
   ¹SNCF Reseau
   ²Universite Paris Saclay

6. Rail Radio Intrusion Detection System (RRIDS) for Communication Based Train Control (CBTC) ........................................................................................................................................39
   Anthony Melaragno¹, K.R. Damindra S. Bandara¹, Ajay Fewell², Duminda Wijesekera³
   ¹George Mason University
   ²Thomas Jefferson High School for Science and Technology

7. The QoS analysis of train-ground communication system based on TD-LTE in urban rail transit .............................................................................................................................................49
   Xiaoxuan Wang , Hailin Jiangy, Tao Tang, and Hongli Zhao
   Beijing Jiaotong University

8. Robustness Study of ZigBee Networks in an EM Environment for Railway Signalling Systems .................................................................................................................................55
   Armando Mendez-Villalon, Steve Greedy, David W. P. Thomas
   The University of Nottingham

9. Feasibility Analysis of Wireless Technologies for Railway Signalling Systems ......................N/A
   Mohamed Samra¹, Shiema Sidahmed², Stephen Greedy², Armando Mndez²
10. Information and Communication Technologies for Enhanced Emergency Management in Taiwan High Speed Rail
Yi Yiung Jen, S.K. Jason Chang
National Taiwan University

11. The Next ETCS Level?
Colin Williams
SNC-Lavalin

Baigen Cai, Fengjiao Zhang, Wei ShangGuan, Jian Wang, Lei Chen
1. Beijing Jiaotong University
2. The University of Birmingham

13. A real-time algorithm for train position monitoring using optical time-domain reflectometry
Adam Papp, Christoph Wiesmeyr, Martin Litzenberger, Heinrich Garn, Walter Kropatsch
1. Austrian Institute of Technology GmbH
2. Vienna University of Technology

Zhichao Qiao, Zhixin Wang, Lu Zhang
Beijing National Railway Research & Design Institute of Signal & Communication Group Co., Ltd

15. Analysis and design of Driver Advisory System (DAS) for energy-efficient train operation with real-time information
Hainan Zhu, Xubin Sun, Lei Chen, Shigen Gao, Hairong Dong
1. Beijing Jiaotong University
2. The University of Birmingham

16. Modeling and Simulation of Railway Electric Traction with Vector Control Drive
Mahran Quraan, Jamal Siam
Birzeit University

Xiaozhou Zhu, Minwu Chen, Shaofeng Xie, Jie Luo
Southwest Jiaotong University
18. Energy-efficient train control including regenerative braking with catenary efficiency ........116
   Gerben M. Scheepmaker, Rob M. P. Goverde
   Delft University of Technology

19. Evaluation of Permanent Magnet Motor Energy Saving Technology for Different Types of
    Railways ...........................................................................................................................................123
   Heather Douglas, Felix Schmid, Clive Roberts, Stuart Hillmansen
   The University of Birmingham

    Storages ........................................................................................................................................130
   Hrvoje Novak, Mario Vasaky, Vinko Lesic
   University of Zagreb

21. Lengths of Time Passengers Spend at Railway Termini - An Analysis Using Smart Card
    Data- ...........................................................................................................................................139
   Taku Fujiyama¹, Bolun Cao²
   ¹University College London
   ²MCC International Incorporation Ltd

22. Intelligent Platform Management ..................................................................................................145
   Antonis Phasouliotis, Colin Williams
   SNC-Lavalin

23. How do principles for human-centred automation apply to Disruption Management Decision
    Support? ...........................................................................................................................................150
   David Golightly, Nastaran Dadashi
   The University of Nottingham

24. TRACK/RAILS: an application and content management framework for railway
    operators ...........................................................................................................................................157
   B. Volckaert¹, W. Kerckhove¹, T. Dupont¹, F. De Turck¹, D. Van Den Wouwer²
   ¹IBCN-iMinds-University of Ghent Gent
   ²Televis Rail

25. Passengers’ anxiety about using the London Underground .............................................................165
   Jisun Kim, Olinkha Gustafson-Pearce
   Brunel University

    Environment .......................................................................................................................................170
   Jabran Bhatti¹, Dirk Van Den Wouwer¹, Wannes Kerckhove², Thomas Dupont²
   ¹Televis Rail NV
   ²Ghent University
27. An in-depth learn from incidents (LFI) approach based on HFACS-RAs
Qingjian Zhan, Wei Zheng
Beijing Jiaotong University

28. Anonymity-based Data Publishing for Preserving Customer Privacy in Railway Systems
Yidong Li, Yumeng A, Huifang Li and Hairong Dong
Beijing Jiaotong University

29. Real World Verbal Protocol Data Analysis of European Rail Traffic Management System Train Driving and Conventional Train Driving
Naghiyev, A.1, Sharples, S.1, Ryan, B.1, Coplestone, A.2, Carey, M.2
1The University of Nottingham
2Network Rail

30. Stochastic Scheduling Approach for Predictive Risk-Based Railway Maintenance
Alice Consilvio, Angela Di Febbraro, Nicola Sacco
University of Genoa

31. Train Timetabling during Infrastructure Maintenance Activities
Diego Arenas123, Paola Pellegrini2, Said Hanafi3, Joaquin Rodriguez2
1FCS RAILENIUM
2Univ Lille Nord de France
3Universite de Valenciennes et du Hainaut Cambresis

32. Railway disruption timetable: Short-turnings in case of complete blockage
Nadjla Ghaemi, Rob M.P. Goverde, Oded Cats
Delft University of Technology

33. Ultra-high Frequency Train Operation for the Realization of Ultra-Convenient Rail Transport (UCRT)
Ryo Takagi, Takahiro Shimizu
Kogakuin University

34. Application of System Dynamics Tools to Model 24-Hour Metro Systems -Integration of System Engineering and Operation Management-
Mohammad Reza Zolfaghari, Clive Roberts, Felix Schmid
University of Birmingham

35. Development of a high-level feasibility analysis model for the selection of railway upgrade options
Xindi Chen, Gemma L. Nicholson, Clive Roberts
The University of Birmingham

37. Safe odometry for high-speed trains .................................................................244
  Diego Herrero Murillas, Luc Poncet
  SNCF

38. Disruption: a new component in the track inspection schedule .........................249
  Mohd Haniff Bin Osman12, Sakdirat Kaewunruen1, Min An1, Serdar Dindar1
  1 The University of Birmingham
  2 Universiti Kebangsan Malaysia

  George Charalambous, Martin Stout
  SNC-Lavalin Rail & Transit

40. Low Power and Low Cost Sensor for Train Velocity Estimation ..........................259
  Max Spindler1, Denis Stein2, Martin Lauer1
  1 Karlsruhe Institute of Technology
  2 FZI Research Center for Information Technology

41. Automatic Railway Track Surveillance using a dGNSS enabled Mobile Onboard Unit in loading optimization .................................................................265
  Martin NOVAK1, Christian HERNETH2, Gerhard ANKERL3
  1 Prosoft Süd Consulting GmbH
  2 Expert Refinery Logistic
  3 GmbH&Co KG

42. Camera Based Driver Support System for Rail Extraction using 2-D Gabor Wavelet Decompositions and Morphological Analysis .........................................................270
  M. Alper SELVER, Ercan ER, Burak BELENIOGLU, Yasin SOYASLAN
  Dokuz Eylül Uni.

43. Intelligent fault diagnosis and prediction technologies for condition based maintenance of track circuit .................................................................276
  Xiaomin Wang, Jin Guo, Lei Jiang, Jiawei Fu, Bin Li
  Southwest Jiaotong University

44. Study on the Effect of Compensation Capacitors on Broken Rail Detection in Audio frequency Track Circuits .................................................................284
  Xinzeng Zhou, Zhixin Wang, Zhiming Liu
  Beijing National Railway Research & Design Institute of Signal & Communication Group Co.,
45. Assessing the Usage Feasibility of TV White Spaces for Railway communication Applications

Mohamed Samra1, Dr Lei Chen1, Prof. Clive Roberts1, Prof. Costas Constantinou1, Dr Anil Shukla2
1The University of Birmingham
2QinetiQ Ltd

46. Track Irregularity Fault Identification Based on Evidence Reasoning Rule

Xiaobin Xu1, Jin Zheng1, Jianbo Yang2, Dongling Xu2, Xinya Sun3
1Hangzhou Dianzi University
2University of Manchester
3Tsinghua University

47. Managing Rail Corrugation through Modelling, Simulation, and Instrumentation Technologies

Andrew Keong Ng1, Zulkifli Bin Alias2, Jean-Francois Chassin2
1Singapore Institute of Technology
2SMRT Trains Ltd

48. Analysis on Harmonic Current and its Impact on Track Circuit in High Speed Railway

Shiwu Yang1, Jianzhao Tian1, Lei Chen2, Hao Xu1, Yong Cui2
1Beijing Jiaotong University
2The University of Birmingham

49. Simulation Model of Speed Control for the Moving-Block Systems under ERTMS Level 3

Ronghui Liu
The University of Leeds

50. On-line Conformance Testing of the Communication-Based Train Control (CBTC) System

Yuemiao Wang, Lei Chen, Jinwen Wei, David Kirkwood, Qian Xu, Jidong Lv, Clive Roberts
The University of Birmingham


Jidong Lv1, Haifeng Wang1, Hongjie Liu1, Chai Ming1, Yuemiao Wang2, Lei Chen3, Ning Zhao2
1Beijing Jiaotong University
2The University of Birmingham

52. Towards Integrated Simulation and Formal Verification of Rail Yard Designs – An Experience Report Based on the UK East Coast Main Line

Lei Chen, Phillip James, David Kirkwood, Hoang Nga Nguyen, Gemma L Nicholson, Markus Roggenbach
53. Petri Net Based Modeling of Railway Intersection Collision Avoidance System
Samriddhi Sarkar, Animesh Dutta
NIT Durgapur

54. D-MOD Dynamic Modelling of Operator Demand - A new simulator module for the evaluation of signaler's demand
Lise Delamare, Andy Lumby, Peter Treble, David Golightly
Hitachi Information Control System Europe Ltd.

55. Interpolating and Denoising Point Cloud Data for Computationally Efficient Environment Modeling
M. Alper SELVER1, E. Yeşim ZORAL1, Burak BELENLIĞLU2, Yasin SOYASLAN2
1Dokuz Eylül Uni.
2Kentkart Research & Development Dept.

56. Experimental study on vibration displacement of a CRH2 EMU under strong wind conditions
Dongrun Liu, Zhaijun Lu, Tianpei Cao, Lei Zhang, Chunli Zhu
Central South University

57. Aerodynamic Analysis of Trains with Different Streamlined Lengths of Heads
Zhengwei Chen, Tanghong Liu, Xisai Zhou, Xinchao Su
Central South University

58. New recycled aggregates with enhanced performance for railways track bed and form layers
C. Saborido, M. Morata
COMSA

Zhang Na, Zhou Dan
Central South University

60. Investigation on Fatigue Life of Rail-Wheel Assembly using Finite Element Analysis
Vinod Kumar1, Gurdeep Singh1, Ravindra K. Saxena2
1DAV University
2Sant Longowal Institute of Engineering and Technology

61. A system dynamics model for railway workers’ safety behaviors
Xingliang Da, Wei Zheng
Beijing Jiaotong University

Huimin Ye, Wei Zheng
Beijing Jiaotong University

63. Scenario Based STPA Analysis in Automated Urban Guided Transport System

Fei Yan, Tao Tang, Hongwei Yan
Beijing Jiaotong University

64. Exploiting redundancy and path diversity for railway signalling resiliency

Igor Lopez, Marina Aguado, Denis Ugarte, Alaitz Mendiola, Marivi Higuero
University of the Basque Country UPV/EHU

65. Towards Safety Monitoring of ETCS Level 2 with Parametrized Extended Live Sequence Charts

Ming Chai1, Yuemiao Wang2, Jidong Lv1, Hongjie Liu1, Lu Zhang1
1Beijing Jiaotong University
2The University of Birmingham

66. Reliability Evaluation of Interlocking Software Based on Improved NHPP Model

Weiqi Wang, Shenghua Dai
Beijing Jiaotong University

67. System Energy Optimisation of Metro-transit System using Monte Carlo Algorithm

Zhongbei Tian, Paul Weston, Stuart Hillmansen, Clive Roberts, Ning Zhao
The University of Birmingham

68. Investigation into Train Positioning Systems for Saving Energy with Optimised Train Trajectories

Hassan Abdulsalam Hamid, Gemma L. Nicholson, Heather Douglas, Ning Zhao, Clive Roberts
The University of Birmingham

69. Scheduling Method for Minimum Energy Consumption Considering Constraints of Time Intervals between Local and Express Trains

Koji Nomura, Masafumi Miyatake
Sophia University

70. A Two-layer Construction of Energy Optimization Approach for Timetable

Fang Cao1, Zhibin Liao3, Shuqi Liu2, Jing Xun1, Xun Luo3
1Beijing Jiaotong University
2Hisense TransTech Co., Ltd.
3Mass Transit Railway Operation Corporation LTD

71. Punctual Train Operation with Energy-saving Driving Advisory System in Dense Traffic
Railway
Yukinori Tonosaki¹, Yoshihiro Koizumi¹, Masahiro Tajima¹, Miyako Miyoshi¹, Toyoyuki Takeba¹, Masafumi Miyatake²
¹Toshiba Corporation
²Sophia University

72. A train regulation approach for energy-saving: a case study for Beijing metro line
Shuai Su, Tao Tang, Jing Xun, Fang Cao, Yihui Wang
Beijing Jiaotong University

73. Verification of Metro Track Signalling Layout Based on Microscopic Simulation
Jinwen Wei¹, Qian Xu¹, David Kirkwood², Yuemiao Wang², Lei Chen², Jidong Lv³, Jingwei Sun⁴
¹Hefei Urban Rail Transit CO., LTD
²The University of Birmingham
³Beijing Jiaotong University
⁴Anhui Comprehensive Transportation Research Institute CO., LTD