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Editorial

ESREL 2020 PSAM 15, the 30th European Safety and Reliability (ESREL) Conference of the European Safety and Reliability Association (ESRA) and the 15th Probabilistic Safety Assessment and Management (PSAM) Conference of the International Association of Probabilistic Safety Assessment and Management (IAPSAM) has brought together the top experts of the world in the science and practice of reliability and safety. It has been a unique World Exposition (a real "Expo Tech") of scientific methodologies and technical solutions developed to advance knowledge for the reliable design and operation of components and systems, for the prevention and management of risk in complex systems and critical infrastructures.

This joint Conference takes place only every eight years: Crete 1996, Berlin 2004, Helsinki 2012 and, then, "virtual Venice" 2020. Actually, the Conference has been originally planned to be held in presence in beautiful Venice, Italy, on June 21-26. Due to the outbreak of the CoViD-19 pandemic, the Conference had to be postponed to November 1-5, first in hybrid format and eventually all online, but still opened in the originally scheduled week of June with a series of top webinars (Aperitivo at ESREL 2020 PSAM 15) by experts in the field of risk assessment and reliability engineering: a great success for the opening event of the longest Conference (June-November).

The Conference theme has been "Reliability of Complex Systems, Safety of Critical Infrastructures, Prevention and Management of Risk". The theme remains at the center of attention as the healthy living of our World of the future, which we are building and which we will leave to those who follow, depends on the reliability and safety of the complex systems and infrastructures upon which it will stand: if we design and operate them in a way that they are reliable and safe, then it will, indeed, be a smart and sustainable world.

The program of the Conference has consisted of 728 abstracts and papers selected through a peer-review process conducted by more than 130 Track Directors, who have organized the work of more than 800 reviewers. The program has been enriched by 10 plenary lectures offered by speakers of international excellence, 5 panels, 11 special sessions and 2 innovation challenges. All the Conference works, that cover the 55 topics and 31 application areas of the Conference, have been published in this book of proceedings and can be open-access downloaded from the Conference e-proceedings (www.esrel2020-psam15.org). Also, for the first time in the history of this Conference series, the video-presentations of the works have been collected and organized in the Conference video-proceedings, which can be watched at esrel2020psam15.event-vert.com.

In closing, we thank all the participants that have supported the Conference in the difficult times of the pandemic and made it a quite unique success, the 233 members of the Technical Program Committee, the members of the local organizing committee, who have succeeded in organizing three Conferences (in presence, hybrid, online) in emergency and all the reviewers that have put an extraordinary effort in keeping the quality of the Conference. We also highly recognize the strong support by the city of Venice, the region of Veneto, the Italian government institutions, the Politecnico di Milano and Mines Paristech universities, and the partners Beihang University, Cassa Depositi e Prestiti, Enel, Fincantieri, Huawei, Jensen Hughes, Saipem who have invested in and contributed to the Conference.

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Session S01: Reliability of Passive Systems in Nuclear Power Plants - Perspectives and Challenges

Assessment of RELAP5-3D for Application on in-Pool Passive Power Removal Systems

Vincenzo Narcisi, Lorenzo Melchiorri, Fabio Giannetti and Gianfranco Caruso

Assessing the Impact of Passive Autocatalytic Recombiners on the Accident Progression in a VVER 1000

P. Groudev, P. Petrova, A. Stefanova, R. Gencheva and P. Vryashkova,

Qualification of RELAP5-3D Code Against the In-pool Passive Energy Removal System PERSEO Data

Andrea Bersano, Cristina Bertani, Nicolò Falcone, Mario De Salve, Fulvio Mascari and Paride Meloni

The Passive Safety Concept of KERENA: From Design to Experimental Verification

Thomas Wagner and Thomas Mull

Risk Assessment of Operation Strategy using High Pressure Emergency Makeup System during SBO

Sang Hee Kang, Ho Rim Moon and Sang Won Lee

Session S02: Life Cycle-Based Resilience Assessment and Management of Structural and Infrastructural Assets

Improving Uncertainty Representation of Offshore Wind Farms Reliability using Expert Judgments
Georgios Leontaris and Georgios Katsouris

Interdependent Infrastructure Interventions Optimization: an Integrative Systems Thinking Approach
Omar Kammouh, Maria Nogal, Mark de Bruijne, Ruud Binnekamp and Ruud Binnekamp

Resilience Quantification of Large-Scale Water Distribution Networks: A Probabilistic Approach
Omar Kammouh, Maria Nogal, Gian Paolo Cimellaro and A. Rogier M. Wolfert

Security and Resilience for Airport Infrastructure
Corinna Köpke, Louis König, Katja Faist, Mirjam Fehling-Kaschek, Jörg Finger, Alexander Stolz, Kelly Burke, Eftichia Georgiou, Vasiliki Mantzana, Ioannis Chasiotis, Isabel Praça, Eva Maia, Nikolaos Papagiannopoulos, Filipe Apolinário and Nelson Escravana

Resilience Assessment of Safety-Critical Systems with Credal Networks
Hector Diego Estrada-Lugo, T.V. Santhosh, Marco de Angelis and Edoardo Patelli

Session S03: Multi-Unit Nuclear Plant PSA

Comparisons of Human Reliability Data between Analog and Digital Environment
Jinkyun Park and Yochan Kim

Assessing Human Performance and Human Reliability in Collaborative Intelligence Scenarios: Upcoming Challenges and Opportunities
Maria Chiara Leva and Luca Podofilini

Flex Hra in Common Backbone Models
Jeffrey A. Julius, Kaydee K. Gunter and Michael B. Hirt

A Framework to Analyze Human Performance Outside the Control Room
Rossella Bisio, Alexandra Fernandes and Claire Blackett

Unified Definitions for Dependency in Quantitative Human Reliability Analysis
Vincent P. Paglioni and Katrina M. Groth

Session S04: Artificial Intelligence for Maintenance Decision Support

An Unsupervised Machine Learning Approach to Extract Wheel and Track Health Status Indicators from Train-Borne Accelerometer Data
Benjamin Baasch, Michael Roth, Sebastian Schulz And Jörn C.Groos

Predicting State of Health and End of Life for Batteries in Hybrid Energy Buses
Mohammed Ghaith Altarabichi, Yuantao Fan, Sepideh Pashami, Sławomir Nowaczyk and Thorsteinn Rögnvaldsson

Agent-Based Maintenance Decision Support System for Power Grids Operating in Electricity Markets
Pegah Rokhforoz, Blazhe Gjorgiev, Giovanni Sansavini and Olga Fink

Impact of the Decision Horizon on Railway Systems Maintenance and Service Scheduling
Omar Bougacha, Christophe Varnier, Noureddine Zerhouni and Pierre Dersin

Anomaly Detection and Classification in Time Series with Kervolutional Neural Networks
Oliver Ammann, Gabriel Michau and Olga Fink

Deep Reinforcement Learning for Optimizing Operation and Maintenance of Energy Systems Equipped with PHM Capabilities
Luca Pincirolì, Piero Baraldi, Guido Ballabio, Michele Compare and Enrico Zio

Session S05: Text Mining applied to Risk Analysis, Maintenance and Safety

Verification of Safety Rules using NLP
Coen van Gulijk and Violeta Holmes

Extracting Knowledge from Near Miss Reports using Machine-Learning Techniques
Silvia M. Ansaldi, Carla Simeoni, Alessandro Di Francesco, Roberto Martini, Luca Di Piramo and Flavia Fattori

A Text Mining and NLP Approach for Identifying Potential Consequences of Accidents in an Oil Refinery
Júly Macedo, Diego Aichele, Márcio das Chagas Moura and Isis Lins

Automated Classification of Injury Leave based on Accident Description and Natural Language Processing
Caio Bezerra Souto Maior, João Mateus Marques de Santana, Márcio das Chagas Moura and Isis Didier Lins

An NLP and Text Mining-Based Approach to Categorize Occupational Accidents
Marcela Silva Guimarães, Hiago Henrique Gomes de Araújo, Thais Campos Lucas, Márcio das Chagas Moura, Isis Didier Lins and Romulo Fernando Teixeira Vilela

Text Mining for the Automatic Classification of Road Accident Reports
Dario Valcamonico, Piero Baraldi, Francesco Amigoni and Enrico Zio

Session S06: Bayesian Network Modelling for Risk Assessment in the Oil and Gas Industry

A Safety-Barrier-based Risk Analysis Model for Offshore Oil and Gas leakage Incidents
Yangfan Zhou, Shengnan Wu, Jianchun Fan and Baoqian Dai

A Multistate Bayesian Network for accounting the degradation of safety Barriers in the Living Risk Assessment of Oil and Gas Plants
F. Di Maio, O. Scapinello, E. Zio, C. Ciarapica, L. Decarli, L. La Rosa

A Novel KPI for Continuously Monitored Safety Barriers based on Probabilistic Safety Margins
F. Di Maio, O. Scapinello, E. Zio, C. Ciarapica, L. Decarli and L. La Rosa

Analytic Hierarchy Process for the Estimation of the Probability of Failures of Safety Barriers in Oil and Gas Installations

F. Di Maio, O. Scapinello, E. Zio, C. Ciarapica, L. Decarli, L. La Rosa

The Risk Assessment and Management of Premature Screen-Out During Hydraulic Fracturing Based on the Bayesian Belief Network Model

Enrico Zio, Maryam Mustafayeva and Andrea Montanaro

Session S07: Fault-Tolerant and Attack-Resilient Cyber-Physical Systems (CPS)

Fault Diagnosis in Smart Grids Using a Deep Long Short-Term Memory-based Feature Learning Architecture

Hossein Hassani, Roozbeh Razavi-Far and Mehrdad Saif

Allocation of Defense Resources Against Cyber Attacks to Cyber-Physical Systems

Wei Wang, Francesco Di Maio and Enrico Zio

Model-Based Fault Injection Experiments for The Safety Analysis of Exoskeleton System

Tagir Fabarisov, Ilshat Mamaev, Andrey Morozov and Klaus Janschek

Enhancing Detection Accuracy of Cyber Attacks Through Dimensionality Reduction

Ehsan Hallaji, Roozbeh Razavi-Far and Mehrdad Saif

Anomaly and Attack Detection in Supervisory Control Networks for Cyber-Physical Systems

Ernesto Del Prete, Fabio Pera, Luca Faramondi, Camilla Fioravanti, Simone Guarino, Gabriele Oliva and Roberto Setola

Is Smartness Risky? A Framework to Evaluate Smartness in Cyber-Physical Systems

Christos Chronopoulos and Nelson Humberto Carreras Guzman

Session S08: Advanced Diagnosis and Prognosis in Bio-medical Engineering

Bayesian Filter Observers based Estimation of Glucose and Insulin Concentration in Plasma

Weijie Wang, Shaoping Wang, Xingjian Wang and Yixuan Geng

Transfer Learning From Grid-Structured Data to Graphstructured Data: Application to Diagnosis of Depression

Jiawei Yang, Shaoping Wang, Xingjian Wang, Rui Liu, Yun Wang, Jian Cui, Yuan Zhou, Jingjing Zhou, Yuan Feng, Lei Feng and Gang Wang

IMU-Based Online Load Spectrum Estimation for Human Knee-Joint

Zhangtao Wang, Xingjian Wang and Shaoping Wang

Blood Coagulation Monitoring and Thrombus Formulation Assessment based on Bioimpedance Spectroscopy

Xuesong Luo, Shaoping Wang and Jian Shi

Video-based Automatic Early Parkinson's Disease Detection System using Biomechanical Features

Changhong Lin and Shaoping Wang

Session S09: NLP, knowledge graphs and ontologies

Pipeline for Machine Reading of Unstructured Maintenance Work Order Records

Yiyang Gao, Caitlin Woods, Wei Liu, Tim French and Melinda Hodkiewicz

Standardised Failure Reporting and Classification of Failures of Safety Instrumented Systems

Stein Hauge, Solfrid Håbrekke, Mary Ann Lundteigen and Lars Bodsberg

Cleaning and Visualization of Unstructured Text in Safety Records

Michael Stewart, Wei Liu, Rachel Cardell-Oliver and Mark Griffin

An Ontology for the Management of Equipment Ageing

Silvia M. Ansaldi, Paolo Bragatto, Patrizia Agnello and Maria Francesca Milazzo

Research on Named Entity Recognition in Chinese Airworthiness Regulation Texts Based on Deep Learning Method

Haotian Niu, Cunbao Ma, Yihan Guo, Pei Han and Siyuan Li

Ranked Tagging of Maintenance Work Order Data Using Nestor

Michael Brundage and Thurston Sexton

Session S11: Human Performance in Resilience, Risk and Safety Assessments

Assessing Human Performance in the Era of Resilience Engineering-A Paradigm Shift ?

Miltos Kyriakidis and Vinh N. Dang

Role Independency in Nuclear Power Plant Control Room Teams-Background for an Empirical Simulator Study

Magnhild Kaarstad and Espen Nystad

A Bayesian Network Approach for the Quantitative Assessment of Resilience of Critical Systems

T.V. Santhosh and Edoardo Patelli

Transfer Learning-Based Driving Style Recognition

Shi Yuchen, Wang Yi and Chen Nan

Crowd Sensitive Indicators for Proactive Safety Management: A Theoretical Framework

Francesco Costantino, Giulio Di Gravio, Andrea Falegnami, Riccardo Patriarca, Massimo Tronci, Antonio De Nicola, Giordano Vicoli and Maria Luisa Villani

The Relation Between Behavioral Factors and Humans' Reactions During Catastrophic Events

Georgia Kaltsidi and Yiannis Xenidis

Session S12: Reinforcement Learning for Industry 4.0

Optimal Part Flow In Maintenance Service Contracts Of Gas Turbines

Luca Bellani, Michele Compare, Enrico Zio, Marzia Sepe, Francesco Annunziata and Fausto Carlevaro

Circuit Breaker Data Analysis Using Copula Correlation

Michy Alice, Loredana Cristaldi and Enrico Ragaini

Agent-Based Modeling and Reinforcement Learning for Optimizing Energy Systems Operation and Maintenance: The Pathmind Solution

Luca Pinciroli, Piero Baraldi, Michele Compare, Sahar Esmaeilzadeh, Mohammed Farhan, Brett Göhre, Roberto Grugni, Luigi Manca and Enrico Zio

Autonomous Algorithm for Bubble Creation Operation in Pressurizer by Deep Reinforcement Learning

Daeil Lee and Jonghyun Kim

Development of Two-level Autonomous System for Startup and Shutdown Operation of Nuclear Power Plants

Jae Min Kim and Seung Jun Lee

Session T01: Accelerated Degradation and Life Test

Evaluation of Optimality Criteria for Efficient Reliability Demonstration Testing

Thomas Herzig, Martin Dazer, Alexander Grundler and Bernd Bertsche

Reliability Prediction using Design of Experiments

Alexander Kremer, Levente Dücső and Bernd Bertsche

Bias Corrected Weibull Parameter Estimation and Impact on Confidence Bounds

Tamer Tevetoglu and Bernd Bertsche

Evaluation of Electronic Components Degradation Using the Accelerated Reliability Testing Data

Zdenek Vintr, Xuan Phong Cu and Cao Vu Tran

Research on Accelerated Degradation Test of Aero-generator Based on Text Mining

Yao Jinyong and Wei Shuo Chen

An Approach to Predict the Lifetime of Shape Memory Actuators based on Accelerated Testing Measurements

Philipp Heß and Stefan Bracke

Reliability Estimation by Usage Rate Method Varying the Quantity of Warranty Data Censored

Eugenio Zappa Neto, Gilberto Fransciso Martha de Souza and Messias Borges Silva

An Accelerated Life Test and Reliability Evaluation Method on Ultrasonic Motors Under Increased Torque Load

Shouqing Huang, Jiacheng Guo, Tengfei Ma, Shouwen Liu and Yun Jia

Research on Identification Method of Bearing Performance Degradation in NPP Based on GG Clustering
Zhang Jiyu, Xia Hong and Wang Zhichao

Research on Burn-in Technology of SiP
TianRui Zhu, Lei Chen and YiFei Han

Session T02: Accident and Incident Modeling

Identification of Near-Miss Situations Between Ships Using AIS Data Analysis and Risk Indicators
Martin Hassel, Martin Grossmann, Asbjørn Lein Aalberg and Rodmar Arntsen

Application of a Severe Accident Program to the Evaluation of SAMG Strategy by using Uncertainty Analysis
Sooyong Park, Kwang-Il Ahn and Seok-Won Hwang

Analysis of the Causes of Aviation Accidents during Controlled Flight into Terrain
Justyna Tomaszewska, Marta Woch, Jakub Krzyszkowski, Mariusz Zieja and Norbert Grzesik

An Interdisciplinary Approach for Investigating an Accident Originating From Leakage in a Gasketed Bolted Joint
Michele Compare, Enrico Zio, Piero Pantaleone, Raffaele Lardani and Dario Palumbo

Scraping Damage Hazard due to Trawling Interference on Subsea Pipelines
Lorenzo Masu, Leonardo Cardinali and Stefania Benucci

Identification of FEP Critical Paths from a Bayesian Network Model for the Risk Assessment of Nuclear Waste Repositories
Edoardo Tosoni, Francesco Di Maio and Enrico Zio

Research for Temporal and Spatial Distribution of Ship Accidents in the Fluctuating Backwater Area of Three Gorges Reservoir Region
Jie Xue, P.H.A.J.M. van Gelder, Eleonora Papadimitriou, Dan Jiang and Chaozhong Wu

A Preliminary Analysis of a Clandestine Take Explosion in Mexico City
Vladimir Avalos-Bravo, Diego Alfredo Padilla Pérez and Blanca Barragan-Tognola

The GRS Source Term Prognosis Software FaSTPro: New Developments for a More Precise Prognosis
Michael Hage and Sören Johst

Implementation of Mitigative Human Actions During Severe Accidents in a Level 2 PSA Event Tree
Sören Johst and Michael Hage

Simulation of Pb-Free Solder Bumps under Thermal-Electric Coupling Conditions
Jiaxin Yuan, Sujuan Zhang, Maogong Jiang and Guicui Fu

Research on Evaluation Analysis Model of Optimal Amount of Redundancy Based on Integrated Navigation System
Jingyue Yang, Feng Zeng and Zhichao Pang

Session T03: Artificial Intelligence for Reliability, Maintenance and Safety

Adaptive Support Vector Machine Combined with Fuzzy Simulation for Failure Possibility Analysis

Chunyan Ling and Zhenzhou Lu

A Procedure for Modelling and Verification of Safety Objectives and Functions

Jing Wu, Mengchu Song, Xinxin Zhang and Morten Lind

Long Short-Term Memory Network for Future-State Prediction in Water Injection Pump

Joaquín Figueroa Barraza, Luis Felipe Guarda Bräuning, Enrique López Droguett and Marcelo Ramos Martins

Generation of a Failure Mode and Effects Analysis with Smartiflow

Christian Müller, Rüdiger Lunde and Philipp Hönig

Towards a Framework for Risk Monitoring of Complex Engineering Systems with Online Operation Data: A Deep Learning Based Solution

Ramin Moradi, Andrés Ruiz-Tagle Palazuelos, Enrique López Droguett and Katrina M. Groth

A Procedure Performing System Using Deep Learning Algorithm for Nuclear Power Plant

Jeeyea Ahn and Seung Jun Lee

A Study on the Influence of Signal Number on Performance of AAKR

Wei Li, Zhenfeng Qi, Juan Chen, Yidan Yuan and Shuhong Du

A System-Level Prognostics and Health Management Framework Based on Graph Convolutional Neural Networks

Andrés Ruiz-Tagle Palazuelos, Enrique López Droguett and Katrina M. Groth

A Reliable Data-Driven Method for Condition Monitoring in Nuclear Power Plants

Zhenfeng Qi, Wei Li, Juan Chen, Yidan Yuan and Shuhong Du

Fault Detection in the Manufacturing Process of Printed Circuit Boards Using Computer Vision

Christoph Rosebrock, Lars Grams and Stefan Bracke

Bayesian Network for Failure Prediction in Different Seasons

Reza Khoshkangini, Slawomir Nowaczyk and Sepideh Pashami

Application of Long Short-Term Memory Neural Networks for CO₂ Concentration Forecast on Amine Plants

Luis Felipe Guarda Brauning, Carlos Henrique Bittencourt Morais, Joaquin Eduardo Figueroa Barraza, Marcelo Ramos Martins and Enrique Lopez Droguett

Application of Computer Vision in the Analysis and Prediction of Fine Grinded Surfaces

Marcin Hinz, Lea Hannah Guenther and Stefan Bracke

Offshore Workover Operations: Reducing Uncertainty of Critical Weather Scenarios by Optimal Use of Simulations and Probabilistic Machine Learning

Simen Eldevik and Stian Sætre

Research on Modeling and Simulation Technology of Aviation Equipment Support System of System Based on Multi-Agent

Ding Gang, Cui Li-Jie, Zhang Liang, Zhang Ya and Wang Jian-Hao

A Methodology for the Identification of the Critical Components of the Electrical Distribution Network of CERN's Large Hadron Collider

Ahmed Shokry, Piero Baraldi, Andrea Castellano, Ugo Gentile, Luigi Serio and Enrico Zio

Extending Fault Trees with Continuous System Variables

Ayşe Karacaörenli and Luigi Portinale

Extreme Gradient Boosting Algorithms for Analyzing Reliability Factors of Natural Gas Transmission Assets

Amel Belounnas and Florent Brissaud

Bayesian Network Model for Assessing Safety and Security of Offshore Wind Farms

Oscar Hernán Ramírez-Agudelo, Corinna Köpke and Frank Sill Torres

Fault Detection Based on Optimal Transport Theory

Bingsen Wang, Piero Baraldi, Xuefei Lu and Enrico Zio

A Coevolutionary Optimization Approach with Deep Sparse Autoencoder for the Extraction of Equipment Degradation Indicators

Ali Eftekhari Milani, Federico Antonello, Piero Baraldi and Enrico Zio

Session T04: Augmented Reality for Safety

An Object Tracking Method to Track Maintenance Objects by Object Detection Based on Deep Learning in Induced Maintenance Environment

ChuanSheng Liang and Chuan Lv

An Augmented and Interactive Aid for Occupational Safety

Andrea Tarallo, Francesco Carbone, Giuseppe Di Gironimo, Domenico Coccorese, Valerio Minopoli, Antonio Lanzotti, Domenico Marzullo and Raffaele d'Angelo

Inail Procedure for Augmented Reality Remote Survey

G. Augugliaro R. Balistreri, F. Giacobbe and E. Pichini

Risk Assessment in the Adoption of Augmented Reality in Production Processes

Gabriele Baldissone, Micaela Demichela and Lorenzo Comberti

Session T05: Big Data and IoT Applications in Reliability and Maintenance

Automating Reliability Analysis: Data-driven Learning and Analysis of Multistate Fault Trees

Sanja Lazarova-Molnar, Parisa Niloofar and Gabor Kevin Barta

"A Lossless Compression Algorithm of Nc Code of CNC Machine Tool Based on Bidirectional GRU"

Yanbo Wang, Guofa Li, Jialong He and Lingda Kong

Session T06: Computational Reliability/Risk Assessment

Towards a Design Framework for Maritime Asset Servitization

Markus Heimdal, Knut Erik Knutsen and Jose Ignacio Aizpurua

Optimization of Deterministic Submodel to Reduce Large Sample Size Runs

Cédric Sallaberry and Robert Kurth

A Method for the Risk Analysis of Energy Supply in Integrated Energy Systems

Huai Su, Enrico Zio and Jinjun Zhang

Enhancing Realism in Fire Probabilistic Risk Assessment of Nuclear Power Plants

Tatsuya Sakurahara, Ha Bui, Seyed Reihani, Ernie Kee and Zahra Mohaghegh

A Modeling Framework for Wind-Integrated Power Systems Operations Accounting for Uncertainty and Flexibility Assessment

Rodrigo Mena, Matías Godoy and Pablo Viveros

Continued Discussion of Failure Mode Modeling and Overall Component Reliability: Are the Data Missing or Censored?

Todd Paulos, Andrew Ho and Curtis Smith

Model Cartography Diving in Complex PSA Models

M. Hibti, T. Friedlhuber and T. Abdellatif

Automatic Translation from Dynamic Models to Boolean Representation Suitable for I&AB Quantification

Marc Bouissou

Session T07: Consequence Modeling and Management

Modelling Liquid Hydrogen BLEVES: A Comparative Assessment with Hydrocarbon Fuels

Federico Ustolin, Ernesto Salzano, Gabriele Landucci and Nicola Paltrinieri

A Research on Effect of Natural Disasters on Evacuation in Case of a Severe NPP Accident

Veda Duman Kantarcioglu and Sule Ergun

The Potential of CFD Simulators for Jet Fire Analysis: The USP-UNESP Experimental Campaign

Adriana Miralles Schleder, Mariana Alves da Silva and Marcelo Ramos Martins

Risk and Consequences of Rapid Phase Transition for Liquid Hydrogen

E. Aursand, L. H. Odsæter, H. Skarsvåg, G. Reigstad, F. Ustolin and N. Paltrinieri

Albarella Future-Zero Carbon Emission

Augusto Zanella, Cristian Bolzonella, Mauro Rosatti, Enrico Longo, Andrea Squartini, Giuseppe Concheri, Damien Banas, Guoliang Xu, Cristina Menta, Vasco Boatto, Steve Taff, Claudio Porrini, Lingzi Mo, Giulia Ranzani, Vitaliy Linnyk, Francesca Visentin and Allan J. Yeomans

Session T08: Crisis Management

Risk Assessment and Resource Demand Analysis of Emergencies on Expressway

Kailun Li, Xuan Liu and Dianliang Xiao

Preparedness in Crisis Management

Lenka Brumarová, Jakub Brumar and Katerina Tomanová

A Case Study on Building Safety: The Coupling of Indoor and Outdoor Air Quality Modeling for Addressing Nearby Terrorist Chemical Attacks on Building Safety

William B. Jones and Brandon Ingram

Crisis Team Setup for Better Improvisation

Jean-Jaques Kohler and Emmanuel Fragniere

Gamified Decision Making for a Participatory Post-Crisis Recovery: A Model Based Process

Antonio De Nicola, Sonia Giovinazzi, Massimo Guarascio, Paola Rizzi and Maria Luisa Villani

Crisis Management: Use of Systemic Approach for Strategic Decision-Making Training

Antonin Hamon, Florian Tena-Chollet, Aurélie Bony-Dandrieux and Vincent Chapurlat

Operation of The Notified Body According to The Directive 2014/68/UE (PED) During The covid-19 Emergency. Case Study of A Surveillance Audit According To Module H1

R. Balistreri, E. Bemporad and F. Giacobbe

Managing Human Reliability In The Context Of Telework-An Approach Based On The Job Demands-Resources Model, Combined With The Bow-Tie Method

Jean-Jaques Kohler and Emmanuel Fragniere

Session T09: Cyber Security

Cybersecurity of Safety Instrumented Systems in the Context of Digitalization: Some Issues and Challenges within Oil and Gas Production Assets

Pengyu Zhu and Jayantha Prasanna Liyanage

Certification Cycles of Train Cyber Gateway

Jan Prochazka, Petr Novobilsky, Dana Prochazkova and Tomas Kertis

Cybersecurity Maturity Assessment of A Critical Infrastructure Organisation-Approach and Observations

Vikash Katta, John Eidar Simensen, Kine Reegård, Siv Hilde Houmb and Erlend Agøy Engum

Clarification of the Cybersecurity and Functional Safety Interrelationship in Industrial Control Systems: Barrier Concepts and Essential Functions

Bálint Z. Téglásy, Bjørn Axel Gran, Sokratis Katsikas, Vasileios Gkioulos and Mary Ann Lundteigen

Assessing Dependability of Web Services Under Moving Target Defense Techniques

Salvatore Distefano, Marco Scarpa, Xiaolin Chang and Andrea Bobbio

Experiences from Implementing and Testing an Approach for Cybersecurity Event Detection in a Critical Aviation System

Erlend Agøy Engum and John Eidar Simensen

Optimal Attack Assignment on Remote State Estimation in Multi Nonlinear Systems: Structural and Asymptotic Policy

Amirreza Zaman, Jafar Zarei, Roozbeh Razavi-Far and Mehrdad Saif

Development and Application of Psa-Based Vital Digital Assets Identification Method

Meejeong Hwang

Twin Based Continuous ICT Risk Management

Fabrizio Baiardi and Federico Tonelli

Dynamic Probabilistic Risk Assessment for Cyber Security Risk Analysis of the Electric Grid

Yunfei Zhao, Nihanth Adina, Katya Blanc, Craig Rieger, Brian K. Johnson, Hangtian Lei, Timothy McJunkin, Pavan Kumar Vaddi, Thomas Ulrich, Ruixuan Li and Carol Smidts

EIDS: Embedded Intrusion Detection System using Machine Learning to Detect Attack over the CAN-BUS

Marco Lombardi, Francesco Pascale and Domenico Santaniello

Addressing Cybersecurity in Energy Islands

Per-Arne Jørgensen, John Eidar Simensen, Coralie Esnoul, Xueli Gao, Silje Arendt Olsen and Bjørn Axel Gran

Cyber Security Evaluation for Nuclear I&C Systems following Software Life Cycle

Jiye Jeong and Gyunyoung Heo

Session T10: Dependability

Making SafeConcert Security-Informed to Enable Multi-Concern Modelling

Barbara Gallina and Zulqarnain Haider

Model-based Analysis of Timing Errors for Reliable UAV Design

Thomas Mutzke, Mikael Steurer, Andrey Morozov and Klaus Janschek

Utilizing Model-Based Timing Analysis for Holistic Dependability Assessment of Unmanned Aerial Vehicles

Mikael Steurer, Thomas Mutzke, Andrey Morozov, Klaus Janschek and Klaus-Peter Neitzke

Session T11: Dependence and Common Cause Failures Modeling and Analysis

Reliability Analysis for Dependent Competing Failure Processes with Two-stage Degradation and External Shocks

Yukun Wang, Guanqi Fang and Rong Pan

Mathematical Justification of the Staggered Test Scheme by a Time-Dependent Failure Model

Shota Soga

Recent Insights from the International Common Cause Failure Data Exchange (ICDE) Project
Hayat Chatri, Gunnar Johanson, Jeffery Wood and Yolande Akl

Framework for Safety Analysis of Complex Systems
Odd Ivar Haugen

Conditional Quantification in PSA
Pavel Krcal, Xuhong He, Pengbo Wang and Ola Bäckström

A Multidimensional Network Approach for Analyzing Hazard Impact Dependencies
Nadine Berner and Josef Scheuer

Session T12: Disaster Management

Human Damage Estimation in Evacuation from Tsunami Caused by a Common Scenario Trench-Type Earthquake
Ken-Ichi Fujita and Harumi Yashiro

Enhancing Disaster Response with Architectonic Capabilities by Leveraging Machine and Human Intelligence Interplay
Karla Saldana Ochoa

Developing a System for Automated Selection of Immediate Measures During Major Catastrophic Events
Florian Lüttner, Jörg Finger, Christian Hanz and Marcel Roth

Opportunities and Challenges for Building Community Preparedness towards Disasters in Malaysia
Siti Hasliah Salleh, Nor Ashikin Mohamed Yusof, Intan Sazrina Saimy and Fadillah Ismail

The Response of the Rescue System to Large Scale Emergencies A Case Study: The Collapse of the Morandi Bridge Part 2 of 2: Technologies for Rescue Service
Filippone Francesco, Bolognese Ciro, Roncalli Luciano and Monterosso Matteo

The Response of the Rescue System to Large Scale Emergencies A Case Study: The Collapse of the Morandi Bridge Part 1 of 2: The Coordination of Several Actors Involved
Battaglia Marcella, Piccinini Fabrizio, Romano Giuseppe and Filippone Francesco

Session T13: Dynamic Reliability / Risk Assessment

Comprehensive Safety Modeling Technology for Space Man-Machine System based on Dynamic Probabilistic Safety Analysis
Lu Chen, Xiaopeng Li, Fuqiu Li and Jing Yang

Coping Time Analysis for Chromium coated Zircaloy for Station Blackout Scenario based on Dynamic Risk Assessment
Asad Ullah Amin Shah, Robby Christian, Junyung Kim and Hyun Gook Kang

Simulation-Based Level 2 Multi-Unit PRA Using RAVEN and a Simplified Thermal-Hydraulic Code
Xiaoyu Zheng, Diego Mandelli, Andrea Alfonsi, Curtis Smith and Tomoyuki Sugiyama

Dynamic Reliability and Reliability-Based Sensitivity Model with Stochastic Load
Di Zhou and Ershun Pan

Application of Dynamic PSA Framework Using Performance-based Surrogate Method to Large LOCA Scenario
Jong Woo Park and Seung Jun Lee

Enhancement of the Treatment of System Interactions in a Dynamic PRA Tool
Yoichi Tanaka, Hitoshi Tamaki, Xiaoyu Zheng and Tomoyuki Sugiyama

Exploring and Generating Thermal-Hydraulic Models for Dynamic PRA Using Statecharts: The example of MAA5
Claudia Picoco, Valentin Rychkov and Tunc Aldemir

Display of Dynamical Behaviour of Nuclear Power Plant States in Risk Monitor System - Use of the GO-FLOW
Methodology and Interactive Update -
Takeshi Matsuoka

Multi-State Hybrid System Reliability Model Based on Hybrid Automaton
Lulu Jia, Cheng Qian, Yi Ren, Dezhen Yang, Qiang Feng, Bo Sun and Zhifeng Li

Reliability Analysis of a Reconfigurable Safety System Using Petri Net and Comparison with Smart Component
Method
Darpan Krishnakumar Shukla and A. John Arul

Importance Measures in Repairable Systems
Marc Bouissou, Ola Bäckström, Pavel Krcaľ and Pengbo Wang

A Multi-State Model of the Aging Process of Cyber-Physical Systems
Zhaojun Hao, Francesco Di Maio and Enrico Zio

Dynamic Risk Analysis of Operation of the Autonomous Underwater Vehicle (AUV)
Ruochen Yang, Ingrid Bouwer Utne, Yiliu Liu and Nicola Paltrinieri

Decision Making for Optimal Primary-Support Selection to Minimise Tunnel-Squeezing Risk
Yu Chen, Edoardo Patelli, Peng Zeng, Ben Edwards, Tianbin Li and Michael Beer

A Dynamic Probabilistic Safety Assessment Method Combining Biasing Technique with MCDET
Pan Xiaolei

A Probabilistic Approach to Dynamic Resilience Assessment of Power Systems
Farshid Faghihi, Pierre Henneaux, Pierre-Etienne Labeau and Mathaios Panteli

Dynamic PRA of Flooding-Initiated Accident Scenarios Using THALES2-RAPID
Kotaro Kubo, Xiaoyu Zheng, Yoichi Tanaka, Hitoshi Tamaki, Tomoyuki Sugiyama, Sunghyon Jang, Takashi Takata
and Akira Yamaguchi

Reliability Forecasting for Components/Systems with respect to 1-, 2- and 3- Dimensions of Stress Factors
Abderrahim Krini and Josef Börcsök

Quasi-Simultaneous System Modeling in ADAPT
Brian Cohn, Todd Noel, Troy Haskin, Doug Osborn and Tunc Aldemir

Advanced Methods for Loss-Of-Flow Accident Precursors Identification in a Superconducting Magnet Cryogenic Cooling Circuit

Vincenzo Destino, Roberto Bonifetto, Nicola Pedroni, Laura Savoldi, Francesco Di Maio, Enrico Zio and Enrico Zio

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M. Schwarz, P. Schepers, J. Van Boggelen, R. Loendersloot and T. Tinga

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Guillaume Kioseyan and Marine Marcihac-Fradin

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Elena Stefana and Nicola Paltrinieri

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Adolphus Lye, Alice Cicirello and Edoardo Patelli

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Martina Kloos, Nadine Berner and Joerg Peschke

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Localizing Cliff-Edge Effects in Accident Analyses Via an Adaptive Gauss Process Sampling Approach

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Garima Sharma and Rajiv Nandan Rai

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Isabel Martón, Ana Sánchez, Sebastián Martorell and Sofia Carlos

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Yu Fan, Chuan Lv, Xiaoyu Sun, Chao Dai and Huan Zhang

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Marwa Belhaj Salem, Estelle Deloux and Mitra Fouladirad

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Nourelhouda Azeli, Khac Tuan Huynh and Antoine Grall

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Firoozeh Haghighi and Bruno Castanier

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Jørn Vatn and Frank Børre Pedersen

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P. Viveros, R. Mena, E. Zio and S. Campos

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Xingheng Liu, Yann Dijoux and Jørn Vatn

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Condition-Based Maintenance Model for A Single Component Subject to Long Preparation Time and Limited Maintenance Opportunities

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Frank Müller, Peter Zeiler and Bernd Bertsche

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Xiaolong Wang, Xiang Fang, Lukas Beller and Florian Holzapfel

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Sayanti Mukherjee, Nisha Botchwey and Emmanuel Frimpong Boamah

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Marie Nilsen, Trond Kongsvik and Stian Antonsen

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Romain Duponnois, Pascal Lamy, Eric Levrat and Ali Siadat

Comparative Study between China and France for Accident Prevention in Confined Spaces

Yan Dong, Yan Liu, Olivier Salvi and Jessica Queron

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Adrian Albero Rojas, Volker Wittstock, Patrick Puschmann, Matthias Putz and Heinrich Mödden

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Jiayue Fang, Ying Chen and Rui Kang

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Roberto Mascherona, Luca Bellani, Michele Compare, Roberto Trucco and Enrico Zio

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Yubing Chen, Meilin Wen, Rui Kang and Qingyuan Zhang

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Pei Yang, Yiyong Xiao, Siyue Zhang, Wenbing Chang and Shenghan Zhou

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Mohammad Rezvanipour, Peyman Amirafshari, Lin Wang and Athanasios Kolios

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G.A. Costa Lima, L.A.N. Costa, A.M. Teodoro Filho, G.M.O. Salles and A. Pinto

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Athanasia Kadrefi, Vasilis P. Koutras and Agapios N. Platis

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Roberto Rocchetta and Luis G. Crespo

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Risto Tiusanen, Eetu Heikkilä, Minna Räikkönen and Tero Välisalo

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Jinrong Cao, Xuan Wang and Diyin Tang

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Mina Saghafian, Nadezhda Gotcheva, Karin Laumann and Martin Rasmussen Skogstad

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Clemens Heitsch, Michael Paßens and Jan C. Stiller

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Trust Me, You Can Soon Start Tearing Down Your Workplace!

Ann Britt Skjerve, Kine Reegård and Grete Rindahl

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Paul Castle, Janet Ham, Melinda Hodkiewicz and Adriano Polpo

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Chunsheng Yang, Yubin Yang, Xiaohui Yang and Qiangqiang Cheng

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S. Kotsilitis, K. Chairetakis, A. Katsari and E. Marcoulaki

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Tom Ivar Pedersen, Jørn Vatn and Kim A. Jørgensen

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Mahmoud Rahat, Sepideh Pashami, Slawomir Nowaczyk and Zahra Kharazian

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Abu MD Ariful Islam and Jørn Vatn

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Bahareh Tajiani, Jørn Vatn and Viggo Gabriel Borg Pedersen

Condition Monitoring and Reliability of a Resistance Spot Welding Process

Matteo Strozzi, Marco Coconcelli, Riccardo Rubini, Gianmarco Genchi and Alessandro Zanella

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Kamrul Islam Shahin, Christophe Simon and Philippe Weber

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Pablo CalvoBascones, Miguel A. Sanz-Bobi and Tomás Álvarez Tejedor

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Pablo CalvoBascones, Miguel A. Sanz-Bobi, Chiara Brighenti and Mattia Ricatto

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Petteri Ojala, Jari Rämö, Minna Niittymäki and Juha Miettinen

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Victor Krymsky, Ramis Imilbaev and Andrey Yunusov

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Kamrul Islam Shahin, Christophe Simon and Philippe Weber

Online Remaining Useful Life Management Considering Operating Conditions to Match the Given Maintenance Date

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Yves Langeron, Khac Tuan Huynh and Antoine Grall

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Simon Hagemeyer and Peter Zeiler

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Aleksander Jakubowski, Rafał Grądzki and Marcin Derlatka

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Ryad Zemouri, Zeina Al Masry, Ikram Remadna, Sadek Labib Terrissa and Nouredine Zerhouni

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Gaetano Quattrocchi, Pier Carlo Berri, Matteo Davide Lorenzo Dalla Vedova and Paolo Maggiore

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Juan Chen, Shilu Xie, Jia Li, Botao Guo and Deyi Wang

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Luca Pincirolì, Piero Baraldi, Ahmed Shokry and Enrico Zio

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Francesco Giacobbe, Elisabetta Bemporad and Fabio Pera

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Anastasia Tzioutziou and Yiannis Xenidis

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Tonja Knapstad, Morten Sommer and Eirik Bjorheim Abrahamsen

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Stefano La Rovere, Gian Luigi Fiorini, Paolo Vestrucci and Giovanni Tenaglia

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Nanda Anugrah Zikrullah, Meine J.P. van der Meulen, Gunleiv Skofteland and Mary Ann Lundteigen

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Zhao Likang and Xiong Yi

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Marco Aurélio Pestana, Carlos Henrique Bittencourt Morais and Marcelo Ramos Martins

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Behnaz Hosseinnia, Stein Haugen, Nima Khakzad and Nicola Paltrinieri

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Sandra Hogenboom, Jan Erik Vinnem and Ingrid Bouwer Utne

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Ruoqi Wang, John Leander and Raid Karoumi

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Rania Ayachi, Elise Vareilles, Thierry Coudert, Konstantinos Kirytopoulos, Michel Aldanondo and Laurent Geneste

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Fateme Dinmohammadi, Babakalli Alkali, Mahmood Shafiee, Saber Saati and Ashraf Labib

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Joel Tzaschel Alves Meira and José Cristiano Pereira

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Renan G. Maidana, Ingrid B. Utne and Asgeir J. Sørensen

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Thor Myklebust, Tor Stålhane and Geir K. Hanssen

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Carmen Carlan and Barbara Gallina

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Hervé Mbonjo, Ewgenij Piljugin and Felix Gärner

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Michelangelo Maria Malatesta, Federica Zonzini, Denis Bogomolov, Nicola Testoni, Luca De Marchi and Alessandro Marzani

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Robert Hartung, Lennart Senger, Julika Arpe and Katharina Klemt-Albert

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Xin Ren, Karel C. Terwel, Jie Li and Pieter H.A.J.M. van Gelder

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Martin Krejsa, Jiri Brozovsky, Petr Lehner and Premysl Parenica

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Pietro Croce, Paolo Formichi and Filippo Landi

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Manuel Chiachío Ruano, José Barros Cabezas and Juan Chiachío Ruano

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Julian Salomon, Niklas Winnewisser, Pengfei Wei, Matteo Broggi and Michael Beer

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Grâce Boyer, Nicolae Brânzei, Jacques Camerini, Moulaye Ndiaye and Jean-François Pétin

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