

Forward to the EPSR Special Issue for PSCC 2022

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The Power System Computation Conference (PSCC) is the meeting on power system computer-based analysis and numerical methods with the longest tradition in Europe. Since the first seminar that took place in Mainz, Germany, in 1962, and the first proper congress held in London, UK, in 1963, the PSCC has run uninterruptedly every three years until 2014, and then every two years. This forward introduces the proceedings of the 22nd iteration of PSCC, which held in Porto, Portugal, in the summer of 2022.

All PSCC iterations are special but, this year, being able to have the event (almost) fully in person, has had a particular meaning for the executive board, the local organization and the technical programme committees, as well as, we trust, all attendees. After two years of lockdowns and travel restrictions caused by the coronavirus pandemic, and after having to switch the PSCC in 2020 to an on-line event, the opportunity to meet in person has given to the PSCC 2022 the impression of a new, energizing start. For many PhD students, this was also the first time they could attend an international conference in person. As organizers, we are proud that the initiation to these students to the international power system community was at the PSCC.

Until the last weeks before the conference, the uncertainty on the ability to hold the conference fully in person was still very high. Just in January, the traditional Technical Programme Committee (TPC) meeting where the recommendations on the papers selected for presentation at the conference are finalized had to be switched to an on-line event due to the rapid world-wide spread of the Omicron variant of the coronavirus. This uncertainty imposed logistical challenges on João Peças Lopes, chair of the Local Organizing Committee (LOC) at the Universidade do Porto, and on the vice-chair and chair of the TPC, Federico Milano and Daniel Molzahn. Fortunately, at the end, we believe that it is fair to say that the bet on a fully in-person event has proved to be a success.

The program of the 22nd PSCC built on the high technical standards developed throughout the conference's long history. The rigor of the PSCC review process is comparable to or tougher than many power engineering journals, leading to acceptance rates around 35% in recent iterations of the conference. With 671 paper submissions, the 22nd PSCC has the second highest number of full-paper submissions, second only to the 21st PSCC with 739. This record number of submissions led to a very competitive acceptance rate of 33.3% for the 22nd PSCC. Demonstrating the worldwide reach of PSCC, the submitted papers included contributions from Europe (51%), North America (26.3%), South America (12%), Asia (6.2%) and Australia (4.5%). The conference program was selected by a TPC consisting of 58 leading power systems researchers from a similar global distribution. Each paper submission was assigned to a TPC advocate who managed the review process. This process resulted in a total of over 1985 reviews from more than 1350 unique reviewers. After curating the reviews, the TPC selected the conference program at an on-line meeting in January 2020. The conference organizers greatly appreciate the TPC members' efforts in managing the reviews for the record number of submissions, the reviewers' time and energy spent evaluating the papers, and the authors' trust in PSCC to evaluate and showcase their work.

The papers in this PSCC 2022 address a wide range of traditional topics (e.g., power quality, state estimation, stability analyses, electromagnetic transients, protection, etc.) along with a number of emerging research directions. Continuing trends from previous iterations of PSCC, other popular topics included uncertainty management; energy markets; aggregation of flexible loads and distributed resources; control of microgrids, power electronics, and HVDC transmission systems; and optimal power flow algorithms.



Notable topics included power system resiliency, multi-energy systems, TSO–DSO coordination, converter-interfaced generation, energy storage, machine learning, forecasting techniques, and electro-mobility. Finally, the program included two invited survey papers titled “Power Systems Optimization under Uncertainty: A Review of Methods and Applications” and “Micro-Flexibility: Challenges for Power System Modelling and Control” which review recent theory and applications in these research areas.

The conference also included a full-day tutorial session titled “Power grid simulation methods for integration of IBRs, from steady-state to time-domain” which provided a detailed look at modelling and simulation methods, specifically, electromagnetic transient analysis, for power systems with high shares of converter-interfaced generation. Additionally, the conference included a roundtable discussion titled “Power System Resilience.” This roundtable discussion featured presentations from three provocateurs from both academia and industry who were tasked with having a spirited discussion on the merits of this relevant research area. The 22nd PSCC concluded with a panel discussion titled “Autonomous System Operation” which shared six panelists’ experiences in this emerging topic from both industrial and academic points of view.

PSCC maintains publicly available records of all conference proceedings at <http://www.psc-ccentral.org>. These records currently include all conference proceedings ranging from the 21st PSCC in 2020 through the 4th PSCC in 1972. Inclusion of the proceedings for the first three iterations of the conference is currently ongoing. Moreover, the organizers of the 22nd PSCC leveraged the experience gained by recording videos of the on-line sessions during the 21st PSCC. Video recordings of the plenary sessions from the 22nd PSCC will also be publicly available via links at <http://www.psc-ccentral.org>.

The partnership with Electric Power Systems Research (EPSR) which started with the 21st PSCC has been maintained also for this 22nd iteration. All accepted and presented papers of the 22nd PSCC are also included in this PSCC 2022 Special Issue of EPSR. The conference organizers thank the Elsevier team for this partnership and for all of their assistance, especially Maria Teresa Correia de Barros, Editor-in-Chief of EPSR; Kathleen Ahamed-Broadhurst, Executive Publisher; and Praveen Johnson, Journal Manager. In this Special Issue of EPSR, the organizers of the 22nd PSCC are proud to present a technical program that we believe lives up to the tradition of excellence established for PSCC.

Prof. Göran Andersson, the President of the 22nd PSCC, closed the conference with the following quote: *Work, finish, publish*. This is the well-known advice that Michael Faraday gave to the young William Crookes, who had asked him the secret of his success as a researcher. With this advice in mind, we are happy to take this opportunity to invite you to join us in June 2024 in Paris, where we plan to hold the 23rd PSCC.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.