



EXECUTIVE SUMMARY

Session 4 – Protection, Control & Automation

SUMMARY

Session 4 received more than 250 abstracts and 181 authors were asked to submit a full paper. Finally, 154 papers have been accepted by the National Committees and the Session 4 Team. The quality of the contributions was very good, and we had 24 papers, presented in the main session and 9 presentations we had in the RIF. The focus was on protection (testing, earth fault, fault location and virtualisation). We also received papers with the focus on communication, and cyber security, so we had an additional Block Communication in the Main Session.



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See you all in Geneva 2025!

MAIN SESSION 4 - BLOCK 1

Automation

In the block “Automation” we received 41 papers. These papers were organised under the subtopics “Optimization”, “Smart and Microgrid”, “Artificial Intelligence” and a fourth category “General”, aggregating the remaining Automation papers that are not included in the previous categories, but which relate with digitalisation, IEC 61850, frequency, and voltage regulation as well as decentralized management of power systems.

In the presentations we saw that Artificial Intelligence is becoming more used in load forecasting, state estimation, enabling the control of distribution grids or other complex optimization uses, like supporting in maintenance operations.

MAIN SESSION 4 - BLOCK 2

Control and Cyber Security

The second block covers all topics around control systems in any kind. Control take place at so many places in the distribution grid, beginning at the customer or in active distribution grids better known as prosumer, in the different voltage levels from low until up to the high voltage level and finally also in centralized systems like a Scada- or FLSR-System. An active network management strategy as well as the control of those participation require accurate data and strong defence against cyber-attacks.

MAIN SESSION 4 - BLOCK 3

Communication and Protection part 1

Communication is not reduced do local application it also takes place between substation, switchgears, and mainly central situated management side where you can find Scada- or other centralized systems. The lectures in this block showed us the current topics.



MAIN SESSION 4 - BLOCK 4

Protection part 2

In addition to general protection topics, we were able to summarize the topics “Virtualisation”, “Algorithms”, “Applications” and the new topic “Testing”. Of course, we also had the never-ending topics of “Earth fault” and “Fault location”. Communications technologies, and within that process-bus applications, have become ever more present in protection technology.

ROUND TABLE 8

Applications of Flexibility in Planning and Operation

The Speakers agreed that flexibility at all levels is of great importance, although the framework for its adoption and how to integrate this tool into network planning methodologies, comparing it with conventional grid investments, as well as how liquid can be a flexibility market is still open for debate. The topics were also well received by the audience, resulting in several questions and a lively discussion.

ROUND TABLE 10

Digital Primary Substation

The speakers and the participants had very contrasting views, which resulted in a very lively discussion. The necessary pillars for a well applicability and acceptance of digital primary substations have been highlighted.

ROUND TABLE 12

Remote Control and Automation Techniques to Improve Continuity of Supply: Performance Requirements and Evaluation

The speakers showed how important new technologies are for the control and monitoring of systems. Automation in medium and low voltage grids is also important to guarantee observability and visibility for the operation process and thus to ensure a secure supply.

RESEARCH & INNOVATION FORUM SESSION 4

The RIF gave an overview about all more scientific papers of Session 4. Several Universities presented their research in automation, controlling and protecting distribution grids. The highlight was the presentation of the Best Young Academic Paper Award Winner of Session 4 (Veronika Barta) about “Analysis of Control Algorithms on Different Low-Voltage Grid Clusters”.

POSTER TOURS

In eight different, very well organized and attended interactive Poster Tours (three Protection-Tours, two Automation-Tours, two Control-Tours, one Communication-Tour) also guided by members of the Session Advisory Group (SAG). Most authors took the opportunity to present their Poster in detail. After the Poster-Tours a lot of intensive and long-lasting discussions occurred along the Poster Lane.

CONCLUSIONS

Highlights of Session 4 at Cired 2023 were especially the topics of digitalisation, virtualization, and artificial intelligence. Furthermore, plenty of small or large improvements and new promising ideas in the field of Automation, Control, Communication and Protection have been presented.