EXECUTIVE SUMMARY

Session 4 – Protection, Control & Automation and Communication

SUMMARY

Session 4 received 182 abstracts, and 163 authors were asked to submit a full paper. Finally, 131 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 7 presentations we had in the RIF. More than half of the papers had the topic of protection. Control & Automation also had a large share. Communication was the smaller part.

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See you all in Stockholm 2027!

MAIN SESSION 4 - BLOCK 1

Protection

Various protection topics were presented in this block. Starting with “Anti-Islanding-Protection”, a fault between 400 kV and 110 kV grid (winner of the young academic award) and the topic “Fault Classification”. IEC 61850 – based overcurrent protection and last but not least “Interoperable line differential protection.

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 participance require accurate data and strong defence against cyber-attacks.

MAIN SESSION 4 - BLOCK 3

Communication and Protection part 1

The focus here was on the topics of earth faults, fault location and fault distance measurement. Fault location based on travelling waves and earth fault distance measurement should be emphasized.

MAIN SESSION 4 - BLOCK 4

Protection part 2

In addition to general protection topics, here we had the virtualisation and centralisation of protection systems as well as 5G-based wide area protection in real networks.

ROUND TABLE 14

Protection, Automation and Control Systems on Virtualized Hardware

One consequent development on the way to digitalisation is the move away from using dedicated physical devices to deploying the protection, automation, and control functions on virtualized devices, which are hosted on powerful computers, called application servers.
The lively discussion highlighted the different aspects. It was a look into the near future with possible solutions to the challenges.

ROUND TABLE 16 – Part 1 and Part 2

Fault and Earth Fault Location, Detection and Prediction

Starting with the basics of single-line faults in networks in the first block, the discussion went deeper and deeper into fault location.
In part 2, a panel of experts was formed from the participants and delved deeper into new solutions and new fault location methods that have already been used in practice. Travelling waves and the possibility of measuring earth fault distances were the subject of lively discussion.

RESEARCH & INNOVATION FORUM (RIF) SESSION 4

The RIF focussed on new developments, academic considerations and research topics. One example is the quantum key application against cyber-attacks or investigating the capabilities of virtual synchronous machines to provide an immediate reserve. Improved protection functions, the presentation of new algorithms and simulations were shown here.

POSTER TOURS

In eight different, very well organized and attended interactive Poster Tours (four Protection-Tours, three Control & Automation-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 2025 were especially the topics of protection (the never-ending story of earth faults and fault location continues). Virtual, centralised protection systems and the integration of communication into protection functions are very topical issues.
Furthermore, plenty of small or large improvements and new promising ideas in the field of Automation, Control, Communication and Protection have been presented.