Electrical power systems are currently witnessing significant structural changes arisen from the integration of renewable energy sources and the liberalization of electricity markets. Especially the distribution system is affected by varying short circuit power and fluctuating power flows. Thus it is operated closer at its technical limits and becomes more prone to fault occurrences and malfunctions of protection devices. In order to solve these challenges attempts are made to transfer protection schemes such as distance protection from transport system to distribution level. Yet the level of grid meshing, line length between secondary substations, star point treatment and the amount of decentralized power feed is different in distribution level. Thus for ensuring the reliability of conventional fault detection schemes deep knowledge of the power system and its protection relevant issues is required. This expertise is not always given and functionality can’t be guaranteed due to the different circumstances in distribution level. The use of artificial intelligence could help to detect faults under difficult conditions and provides additional flexibility.

Instead of manually setting the parameters of conventional protection methods novel algorithms based on computational intelligence can teach fault classifiers to detect and identify faults in power systems. Furthermore signal processing such as filtering input signals can become obsolete which means that all available information contained in the input signal can be used for protection applications. Thus protection methods can be developed that do not have to be parameterized at great expense but can be easily trained to recognize faults. Thereby safe fault detection is possible without the demand for deep knowledge of the power systems behavior. This seminar provides an insight into methods of artificial intelligence for power system protection and its requirements in medium voltage level.

**Targets:**
- Analysis of the challenges and requirements for protection in distribution level
- Detailed description of the most important and novel methods of computational intelligence
- Investigation of research and pilot projects applying methods of computational intelligence
- Presenting the results followed by discussions

**Requirements:**
- English Skills
- Basic knowledge of power system operation or signal processing

**Benefits:**
- Possibility to gain the English proof

Please contact Björn Keune for registration until the 20th of December 2013.
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