

# Master's Thesis

## « Data Coding for Wireless Transmission in Large Industrial Plants »

### Background

The deployment of wired fieldbuses substantially contributes to the costs of large industrial plants, for example concentrated solar power plants with diameters of several hundred meters. In order to reduce these costs, efforts are being made to replace wired fieldbuses by wireless solutions. Thereby, it is essential to maintain reliability and real-time capabilities to prevent damage and retain efficiency.

In order to ensure a reliable and fast signaling in emergency situations, a prototype of a radio link that operates in the 868 MHz band was built. However, the reliability for larger distances still leaves room for improvement. Disturbances on the radio link may lead to bit errors in the received message, as well as preventing the reception of a correct sync sequence that is needed to signal the start of a message. The task is aided by the fact that the payload is small, so it is advised to use an appropriate data coding to receive the correct message even in cases of disturbances.

### Tasks

- Compare existing data coding schemes in respect to the application
  - ◆ e.g. Maximum Length Sequence, Gold Codes, Barker Codes, (Reed-Solomon-Code, Trellis-Code...)
- Select one or more appropriate data coding schemes that enable error correction as well as synchronization
- Implement them for the existing hardware
- Build a framework for convenient assessment of radio ranges
- Evaluate the implementation and compare it with the existing solution

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