



# INTERESTING PROJECTS

ARE WAITING FOR YOU AT ENERGINET



## STOCHASTIC ASSESSMENT OF HARMONIC DISTORTION IN A MODERN TRANSMISSION SYSTEM

### SEMESTER:

Master's thesis

### KEYWORDS:

Power Quality, Harmonic Analysis, Modern Transmission System

### BACKGROUND:

As the Danish TSO, Energinet is responsible for ensuring that the power quality of the transmission system is in compliance with domestic and international standards. This partly involves the need for performing harmonic analyses for projects which involve connection of voltage distorting facilities, such as wind power plants or data centres. The methods for these studies require that the system's parameters are welldefined. However, it will be greatly beneficial if the studies can be conducted in the early project phases, when system parameters are uncertain.

### PROBLEM:

The primary objective of this project is to determine how much the results of harmonics studies can vary as a consequence of the uncertainty of the design phase.

### DESCRIPTION:

The project must identify how to represent the design phase's uncertainties statistically. The statistical representations are utilized by e.g. a Monte Carlo approach for determining the level of harmonic voltages in a point of the transmissions system prior to it being constructed. The results are compared to harmonic estimations based on the initially assumed system parameters. The final results are used for determining a method for obtaining accurate harmonic estimations during the design phase.

### CONFIDENTIALITY:

Partly

### LANGUAGE:

Danish or English

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