

# Locating distribution power system fault employing Bayes Theorem with Subjective Logic

Bahri Uzunoğlu

Department of Engineering Sciences, Division of Electricity  
Centre for Renewable Electric Energy Conversion

Uppsala University, The Angström Laboratory,  
Box 534, 751 21 Uppsala Sweden

Department of Mathematics, Florida State University, Tallahassee, FL, USA 32310

Email: [bahri.uzunoglu@angstrom.uu.se](mailto:bahri.uzunoglu@angstrom.uu.se), [muhammed.ulker@angstrom.uu.se](mailto:muhammed.ulker@angstrom.uu.se),  
[bahriuzunoglu@computationalrenewables.com](mailto:bahriuzunoglu@computationalrenewables.com)

## Abstract

Prompt and effective power system restoration is essential for the minimization of downtime and cost which can get substantial rapidly after a system blackout. Most grids do not have the sensors to diagnose faults for algorithms that employ these measurements. Instead assessment depends on customer calls that have lost power while the input of the field technician is not reflected into assessment in a formal way. This paper investigates fault location detection for service restoration based on a Distribution Automation System (DAS) with a centralized intelligence Bayesian probabilistic approach that takes into account field technician subjective opinion. The approach employs probabilistic logic and subjective logic based on evidence theory. A simplified model of distribution power system is employed to introduce new concepts that employ evidence theory with subjective and probabilistic logic to address the insufficient information.

## Index Terms

Distribution system, Fault detection, Subjective logic, Bayesian methods