Topology Inference for RDF

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Chapter 1

Introduction

This website hosts

- ☐ Formulation using Integer Programming
- ☐ Direct Impedance Method
- ☐ Fixed Point Method for Power Flow

Chapter 2

Bus and Edge

There are roughly two types of electrical devices in power grids.

type	definition	examples
delivery element	transport power from one place to another	cable, transformer, capacitor
conversion element	convert power from or to another form	solar panel, battery

- Ignore conversion elements. Not necessary in power flow calculation.
- Delivery element will be called **edge**.

Another concept, **bus**, represent the place where two different delivery elements joint or end of a delivery element, but there is no physical entity corresponding to a bus. There are three common types of buses:

type	know quantities
slack bus	voltage magnitude and phase angle
PQ bus	real power injection and reactive power injection
PV bus	real power injection and voltage magnitude

It is sufficient to model most of RDFs with PQ buses and one kind of edges, cables:

- One slack bus in RDF, corresponding to the **root**.
- Root not in any matrix.
- Ignore other delivery elements.

Chapter 3

Two Special Concepts for Power Flow

3.1 Channel

3.2 Snapshot

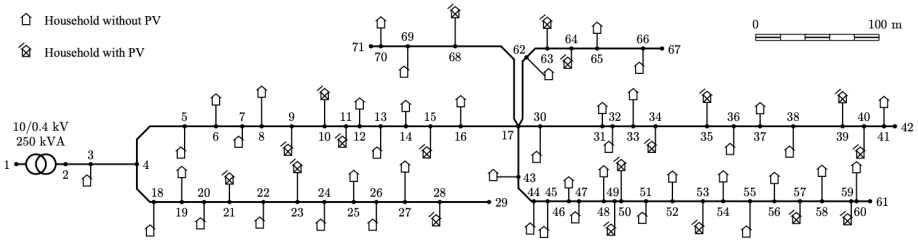
Snapshot is a concept to include power injections and voltages at one time index

- input: real power injections at all channels of PQ buses
- output: voltages, current flow, power flow

Zero-load snapshot is the snapshot where power injections at all the channels are zero and voltages equalt o rated voltages in corresponding phases.

Chapter 4

Radial Distribution Feeder



- located in Belgium.
- one step-down transformer between bus 1 and bus 2 (not considered)
- bus 1 is omitted
- three-phase four-wire cables
- one phase star connection
- Houses associated with buses 3, 7, 10, 13, 16, 20, 23, 26, 30, 33, 36, 39, 43, 46, 49, 52, 55, 58, 62, 65, 69 are connected through phase A.
- Houses associated with buses 5, 8, 11, 14, 18, 21, 24, 27, 31, 34, 37, 40, 44, 47, 50, 53, 56, 59, 63, 66, 70 are connected through phase B.

Chapter 5

Power Flow