Main Simulator

Jake Kolevas, Aidan Gresko

March 25, 2025

1 Overview

This project aims to simulate an advanced power system that involves transmission lines, transformers, buses, and other components of a power grid system.

2 Class Diagram

insert class diagram

3 Classes

3.1 Bus

This class inserts the busses needed to build circuit. The class is designed such that any amount of busses can be added to the circuit and will be properly classified into PV, PQ, or slack busses

3.2 Transformer

3.3 Transmission Line

3.4 Conductor

Since the ACSR conductor type is used this class collects all the parameters about the conductors.

3.5 Bundle

Since this circuit will use multiple conductors per phase in the transmission line this class is needed to calculate the parameters per phase

3.6 Geometry

This class calculates how the location of the transmission lines affect certain parameters.

3.7 Circuit

This class acts as the main source of controlling the flow of power throughout the system. It calls other methods and utilizes them to create objects and insert values for power flow analysis.

...

4 Equations Used for Power Calculations

5 Example Problem with Solution

Transformer stuff:
Impedance: $Z = V_{sc}/I_{sc}$
$R = P_{sc}/I_{sc}^2$
Admittance: $X = \sqrt{Z^2 - R^2}$