

2017 PLS-CADD Advanced Training and User Group

## Electrical Analysis Tools

by

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Power Line Systems

# Introduction

- EMF Calculator – v6.50
  - Electric and Magnetic Fields
- Line Constants Calculator – v14.00
  - Positive Sequence of the Impedance Symmetrical Components
- Lightning Protection Calculator – v14.49
  - Rolling Sphere Method
- Moving from **Sections** to **Sections / Electric** submenu

# EMF Calculator

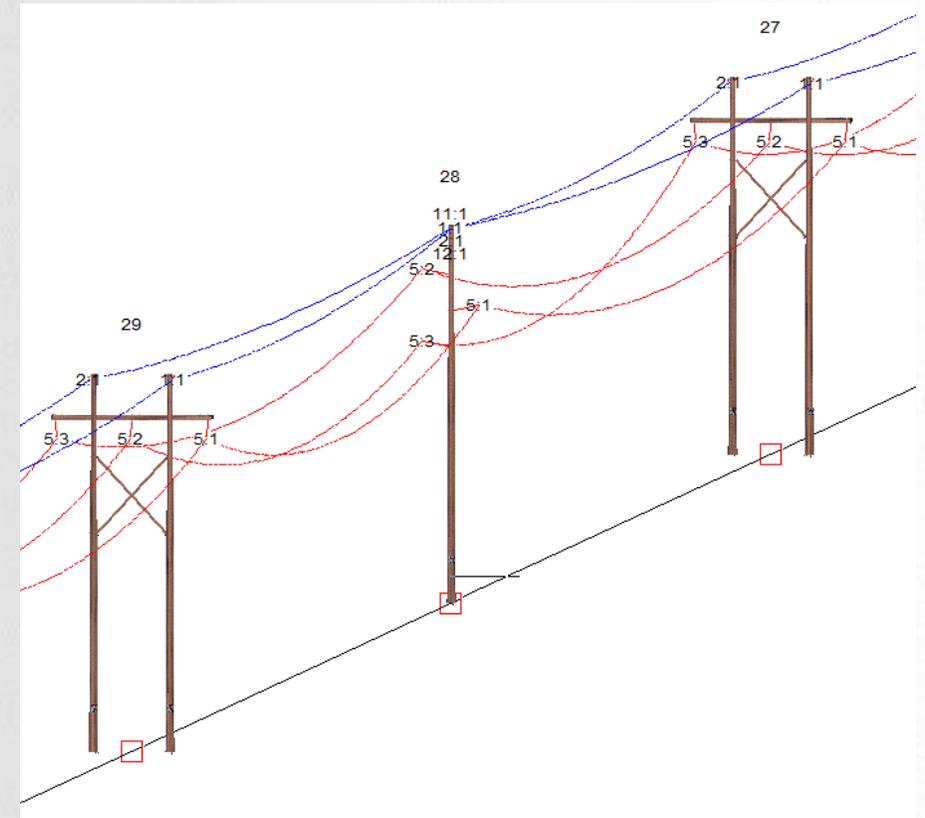
- **Cross-sectional Electric and Magnetic Fields**
  - Selected Station of a Single Span
  - Wire Positions From the Displayed Weather Case
  - Calculations Based on EPRI Red Book Methodology
- **Graphs and Tabular Report**
  - Display Wire Positions
  - Display and Check User Specified Thresholds

# Line Constants Calculator

- Impedance Symmetrical Components
  - Positive Component Only, Based on EPRI Red Book Method
  - Ignores Ground Effects and Mutual Coupling
  - Resistance, Inductive Reactance, Capacitive Reactance and Impedance Magnitude and Phase
  - Select Sections or Entire Line
- Before You Run
  - Electrical Properties of Your Cable Files
  - Circuit Information in Section Table

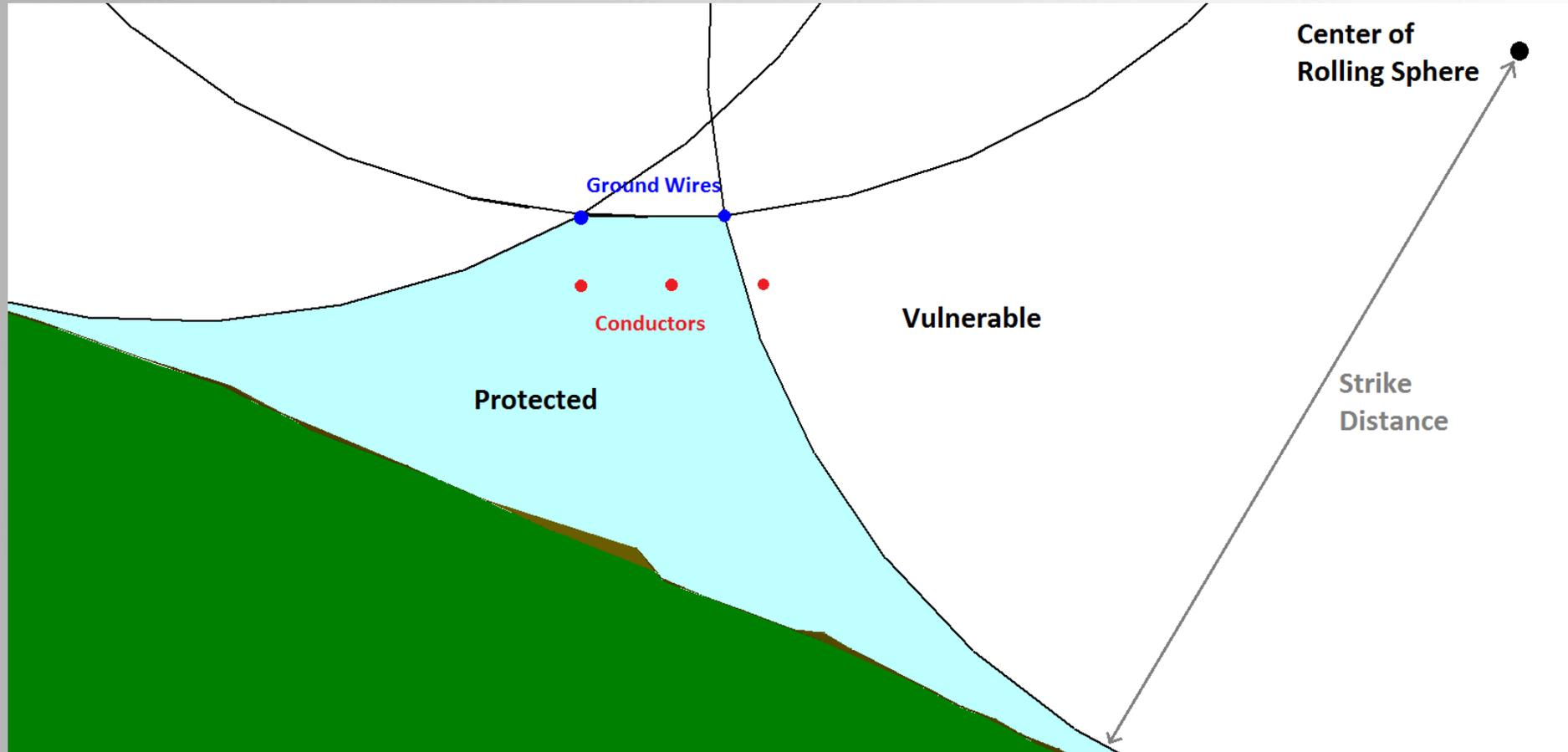
# Line Constants continued

- Cable Position for Geometric Mean Distance (GMD)
  - Weather Case Selection
  - Measurement Location
    - Back Structure Attachments
    - Ahead Structure Attachments
    - Mid-span Positions
    - Averaged Over Entire Span



# Lightning Protection Calculator

- Rolling Sphere Method



# Lightning Protection continued

- Before You Run
  - Ground TIN Required
  - Include Any Other Grounding Points in TIN
- User Input
  - Weather Case
  - Identify Ground Wires
  - Strike Distance
  - Calculation Interval

# Lightning Protection continued

- Rolling the Sphere
  - Roll Sphere At Interval Steps Around Every Ground Wire
  - Looking for Gnd Wire - Gnd Wire or Gnd Wire - Gnd TIN
- Protection Coverage TIN
  - Built From Sphere Arcs
  - All Conductors Compared to Coverage TIN Surface
- Gaps
  - Caused by Sphere Rolling “Underneath” Ground Wire

# Conclusion

- Improving Electrical Analysis Tools
  - Lightning Protection Reporting
  - Zero Sequence Line Constants Being Worked On
- Feedback and Requests Encouraged
  - Best to e-mail **support@powline.com**

# Power Line Systems

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