

SES-EUROPE

30 avenue du Général Leclerc

38200 VIENNE

☎ : 04 26 05 33 18 –

Web: www.sestech.fr

ABSTRACT CeoCor 2019

Multi-Region Soil Model for Electromagnetic Interferences Analysis

It is now common for electromagnetic interference studies to investigate joint-use corridors that extend well over one hundred kilometers and it is essential for such models to account accurately for variations in soil structures along the corridor to properly compute leakage impedances and through earth as well as inductive coupling between energized conductors buried metallic structures. Such as pipelines and railways.

While solutions exist for a rather large variety of different soils, these same solutions cannot be used to treat multiple regions. In particular, studying objects like pipeline valve stations for faults that are not in the same soil since the fault location is essentially a random event. A multi-region soil computation capability is able to handle such issues.

In this work, we introduce a new computational methodology to account for multiple multilayer soil models in a single MultiFields software computer model. Figure 1 illustrates the multi-region multilayer soil concept.

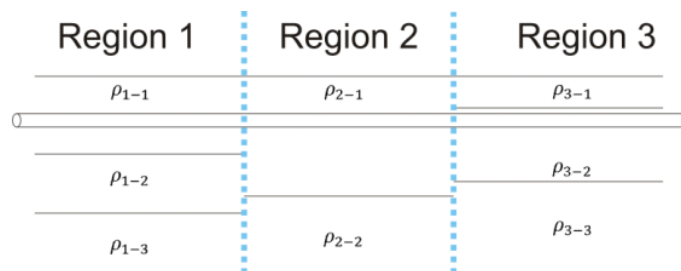


Figure 1 : Standard case of long conductor that crosses three horizontally layered soil regions

Results obtained with this algorithm and their validation on a simple model are first presented. Results will be compared with the MultiGroundZ software that supports analytical solutions of vertical soil layers. Then a focus is made on a complex system involving a transmission line and a pipeline sharing a common corridor to investigate the impact of this new approach on GPR and coating stress Voltage under both steady state and fault conditions.

