The Coupling Analysis of the Field to Underground Tunnel Engineering Using AH FDTD Method

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***Abstract*—Electromagnetic pulse (EMP) generates a large transient voltage and current in the transmission line, which may cause failure or permanent damage to the electrical system and electronic system. A lot of research is carried out on transmission line coupling by using time domain or frequency domain methods. In previous work, we have proposed an unconditionally stable AH FDTD method to analyze field-to-transmission line coupling problems. In this paper, the coupling of field to underground tunnel engineering is investigated by using the unconditionally stable Associated Hermite (AH) FDTD method. To meet the real requirements, the ultra-wideband pulse with oblique incidence is considered for the field to underground tunnel engineering coupling under the case of dispersive geotechnical medium with various depths, different shapes of tunnel (including circular and rectangular).**

Keywords—Associated Hermite; FDTD; couping; dispersive.