LIST OF SYMBOLS

\( \mu \) = Magnetic permeability (Henry/meter).

\( \sigma \) = Electrical conductivity (mhos/meter).

\( E \) = Electric field intensity (volt/meter).

\( D \) = Dielectric displacement.

\( H \) = Magnetic field intensity (Ampere - turn/meter).

\( B \) = Flux density (or magnetic induction) (weber/sq.meter).

\( I \) = Electric current (ampere).

\( J \) = Electric current density (Ampere/sq.meter).

\( \sigma_l \) = Conductivity value in the longitudinal direction (in chapters, 2, 3, 4 and 5) in anisotropic medium.

\( \sigma_{l1} \) = Conductivity value in the longitudinal direction in anisotropic medium (in chapters 6 and 7.B).

\( \sigma_{l2} \) = Conductivity value in the longitudinal direction in anisotropic medium (in chapter 7.C).

\( \sigma_t \) = Conductivity value in transverse direction in anisotropic medium (in chapters 2, 3, 4 and 5).

\( \sigma_{t1} \) = Conductivity value in the transverse direction in anisotropic medium (in chapters 6 and 7.B).

\( \sigma_{t2} \) = Conductivity value in the transverse direction in anisotropic medium (in chapter 7.C).

\( W \) = Frequency of the electro-magnetic waves.

\( r_0 \) = Propagation constant in air.

\( r_l \) = Propagation constant in anisotropic medium (in chapters 2, 3, 4 and 5).

\( r_{l1} \) = Propagation constant in anisotropic medium (in chapters 6 and 7.B).

\( r_2 \) = Propagation constant in lower half-space (in chapters 3, 4 and 6).
\( r'_{2}(z) \) = Propagation constant in transition layer (in chapter 7).

\( r_3 \) = Propagation constant in isotropic lower half-space (in chapter 7,5).

\( u_0 \) = Wave number in air.

\( u_2 \) = Wave number in lower isotropic half-space (in chapters 3, 4 and 6).

\( s \) = Wave number in anisotropic medium.

\( \beta \) = (a) Position of the observer (in chapter 2).

(b) Modulus of the modified Bessel function (in chapter 7).

\( \beta_1 \) = Modulus of modified Bessel function of first kind at \( z = h_1 \) (in chapter 7).

\( \beta_2 \) = Modulus of the modified Bessel function of first kind at \( z = h_2 \) (in chapter 7).

\( \beta_1 \) = Modulus of the modified Bessel function of second kind (in chapter 2).

\( \alpha_0 \) = (a) Radial distance (in chapter 2).

(b) Numerical distance (in chapters 3 and 5).

(c) Angle of inclination (in chapters 6 and 7).

\( \alpha_1 \) = Modulus of the modified Bessel function of second kind (in chapter 2).

\( m \) = Coefficient of anisotropy.

\( \varepsilon \) = Electrical permittivity (in chapter 1).

\( \sum_1 \) = Ratio of the conductivities of the lower half-space to the longitudinal conductivity of the upper anisotropic layer (in chapters 3 and 4).

\( b \) = (a) Ratio of the conductivities of the lower half-space to the longitudinal conductivity of upper anisotropic layer (in chapter 6).
= (b) Ratio of the conductivities of the lower half-space to the longitudinal conductivity of the upper most anisotropic layer (in chapter 7.B).

= (c) Ratio of the conductivities of the lower anisotropic layer to the upper isotropic layer (in chapter 7.C).

h = (d) Position of the dipole in the upper anisotropic conducting layer (in chapters 3 and 4.B).

= (b) Normalized position of the dipole in the lower half-space (in chapter 4.C).

= (c) Height of the source dipole above anisotropic half-space (in chapter 5).

= (d) Normalized thickness of the transition layer \( h_2 - h_1/h_1 \) (in chapter 7).

\( h' \) = Normalized depth of the buried dipole (in chapter 3).

\( h_1 \) = Thickness of the upper anisotropic layer (in chapter 4.C).

\( h_2 \) = Depth of the source dipole (in chapter 4.C).

H = Normalized depth of the buried dipole (in chapter 4.B).


D = Normalized position of the receiver on the earth's surface (in chapter 4.B).

\( d \) = Thickness of the upper anisotropic layer.

\( \text{ber}, \text{bei} \), \( \text{ker}, \text{ksi} \) = Kelvin's function.

\( J_0, J_1 \) = Bessel functions of first kind of order zero and one.

\( I_0, I_1 \) = Modified Bessel function of first kind of order zero and one.
$K_0, K_1$ = Modified Bessel function of second kind of order zero and one.

$h_1/\delta_1$ = Normalized skin-depth (in chapter 7).

$d/\delta_1$ = Normalized skin-depth (in chapter 6).

$\delta$ = Skin-depth (in chapters 6 and 7).

$\rho_a$ = Apparent resistivity.

$\rho_L$ = Resistivity value in the longitudinal direction (in chapters 6 and 7.B).

$\rho_1$ = Resistivity value in the upper layer (in chapter 7.C).

$(\rho, \phi, z)$ = Cylindrical coordinates.

$Z$ = surface impedance (in chapters 5, 6 and 7).

$(\theta - \phi)$ = Phase-difference.

$L_1$ = Sommerfeld's integral.

$P_1$ = Foster's Integral.