

KMS Technologies – KJT Enterprises, Inc.

Appendix 5

List of Figures, Tables, Symbols and References

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Appendix 5

List of Figures, Tables, Symbols and References

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CONVENTIONS AND LIST OF SYMBOLS

VECTORS and MATRICES

- g** – bold lower case symbols represent vectors, except for σ (in chapter 4) which is not written bold face.
- J** – bold capitals represent matrices (e.g. Jacobian matrix containing the derivations of the model function with respect to the model parameters).
- *** – denotes the convolution operator.
- y** – data vector containing the field observations.
- e** – error vector.
- f** – model function vector containing the model function values at the same points as the field observation.
- g** – discrepancy vector.
- j** – current density.

SCALARS

- A** – receiver equivalent area (for magnetic sensors).
- BE, BH** – reciprocal modified impedances.
- D₀** – dipole moment (= current times transmitter length).
- dl** – transmitter dipole length.
- f** – model function.
- F** – formation factor.
- h_i** – thickness of the *i*-th layer.
- H_x, H_y, H_z** – magnetic field components.
- H(z)** – *z* transform of transfer function.
- J₀, J₁** – Bessel functions of zeroth and first order.
- K, v** – controlling factors for the inversion.
- l** – receiver electric dipole length.
- M** – number of layers.
- m** – number of model parameters.

- p** – model parameter vector.
- p₀** – initial model vector.
- q** – parameter difference vector.
- q, r** – transformed parameters.
- B** – magnetic induction.
- D** – electric displacement; diagonal matrix containing parameter weights.
- E** – electric field intensity.
- H** – magnetic field.
- I** – identity matrix.
- I_w** – weighed Jacobian matrix.
- S, T** – matrices containing information about the eigenparameters.
- U, V** – orthogonal matrices for the SVD.
- W** – weighting matrix.

- n** – number of data points.
- p_i** – model parameters.
- R₁, R₂** – roughness for the resistivity versus depth function.
- r** – offset between transmitter center and receiver center. Radius vector in the *Z*-plane.
- s** – fraction of pore volume. Cumulative conductance
- s(t)** – system response function.
- t** – time values.
- U_z** – voltage induced in an induction coil.
- V_x, V_y** – voltage measured between electric field sensors in *x* and *y* direction.
- V_x** – volume fraction of shale.
- x, y** – *x*, *y* coordinates. *x* is taken parallel to the transmitter dipole.
- x(t)** – input function.

- $y(t)$ – output function.
 $X(z)$ – z transform of input function.
 $Y(z)$ – z transform of output function.
 z – z -transform variable.
 z_0 – zeroes on the z -plane.
 z_p – poles on the z -plane.
 Δ – parameter difference vector.
 κ – $\text{SQRT}(i\omega\mu\sigma)$; frequency wavenumber.
 ϵ – dielectric permittivity.
 η – proportionally factor relating real parts of poles and zeroes with each other.
 λ_{ii} – normalized eigenvalues.
 μ_0 – $4\pi \cdot 10^{-7}$ Vs/Am magnetic permeability.
 ρ – resistivity.
 $\rho_a^{\text{E.T.}}$ – early time apparent resistivity.
 $\rho_a^{\text{L.T.}}$ – late time apparent resistivity.
 ρ_u – horizontal resistivity.
 ρ_w – resistivity of pore fluid.
 ρ_x – resistivity of shaly rock fraction.
 σ – conductivity; standard deviation.
 Φ_E, Φ_M – Debye potentials.
 ϕ – porosity; angle between transmitter and offsets.
 ω – angular frequency.
 τ – normalized time.

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