Geophone Model

Geophone Parameters:

.param G=24.5 ; Sensitivity - V / meter/sec
.param F0=4.5 ; Natural frequency - Hz
.param D=0.60 ; Open Ckt. damping ratio
.param M=0.0113 ; Mass - kg
.param Rc=380 ; Coil resistance - Ohms
.param Lc=32mH ; Measured coil inductance

Computed electromechanical analogs:

.param w0=2*pi*F0 ; Natural freq. - rad./sec.
.param Ceqv=M/(G*G) ; Fd
.param Leqv=G*G/(w0*w0*M) ; Hy
.param Reqv=G*G/(2*w0*M*D) ; Ohms

SPRING-MASS ANALOG RELATIONSHIPS

Although SI units are used here, any consistent set of units may be used, along with the proper units for ground motion.
Note: Ceqv is scaled by 1/G^2, L & Reqv by G^2. Voltages are scaled by G and currents by 1/G.

Voltage - V = Velocity - m/s
Current - A = Force - N
Charge - Coul. = Momentum - Kg m/s
Resistance - Ohms = 1/Damping Coeff. - m/Ns
Inductance - Hy = Spring compliance - m/N
Capacitance - Fd = Mass - Kg