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function [lat, long, h] = xyz2llh(X,Y,Z)
    a = 6378137.0; % earth semimajor axis in meters
    f = 1/298.257223563; % reciprocal flattening
    b = a*(1-f); % semi-minor axis

    e2 = 2*f-f^2; % first eccentricity squared
    ep2 = f*(2-f)/((1-f)^2); % second eccentricity squared

    r2 = X.^2+Y.^2;
    r = sqrt(r2);
    E2 = a^2 - b^2;
    F = 54*b^2*Z.^2;
    G = r2 + (1-e2)*Z.^2 - e2*E2;
    c = (e2*e2*F.*r2)./(G.*G.*G);
    s = ( 1 + c + sqrt(c.*c + 2*c) ).^(1/3);
    P = F./(3*(s+1./s+1).^2.*G.*G);
    Q = sqrt(1+2*e2*e2*P);
    ro = -(e2*P.*r)./(1+Q) + sqrt((a*a/2)*(1+1./Q) - ((1-e2)*P.*Z.^2)./(Q.*(1+Q)) - P.*r2/2);
    tmp = (r - e2*ro).^2;
    U = sqrt( tmp + Z.^2 );
    V = sqrt( tmp + (1-e2)*Z.^2 );
    zo = (b^2*Z)./(a*V);

    h = U.*( 1 - b^2./(a*V) );
    phi = atan( (Z + ep2*zo)./r );
    lambda = atan2(Y,X);

    lat = phi.*180./pi;
    long = lambda.*180./pi;

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