```matlab
function accel = J2_accel( pos )
%J2_accel Acceleration due to J2
fcnPrintQueue(mfilename('fullpath')) % Add this code to code app

J2 = 0.00108248;
mu = 398600.4; %km3/s2
Re = 6378.145; %km

r = norm(pos);
z = pos(3);
const = 1.5*mu*J2*Re*Re/(r*r*r*r*r);
sin_sq_phi = z*z/(r*r);

accel = const*[5*sin_sq_phi - 1;
    5*sin_sq_phi - 1;
    5*sin_sq_phi - 3].*pos;
end
```

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