

Gauss perturbation equations

$$\frac{da}{dt} = 2a^2 [e \sin \theta S' + (1 + e \cos \theta) T']$$

$$\frac{de}{dt} = p \sin \theta S' + p(\cos \theta + \cos E) T'$$

$$\frac{dI}{dt} = r \cos u W'$$

$$\frac{d\Omega}{dt} = r \sin u \operatorname{cosec} I W'$$

$$\frac{d\omega}{dt} = \frac{1}{e} [-p \cos \theta S' + (r + p) \sin \theta T'] - \cos I \frac{d\Omega}{dt}$$

$$\frac{dM}{dt} = n + \frac{\sqrt{1 - e^2}}{e} [(p \cos \theta - 2er) S' - (r + p) \sin \theta T']$$