$_{J}PLCaltect_{F}ODT10_{W}ithoutPeople.png$
$_{J}PLCaltect_{F}ODT10_{W}ithPeople.png$
$_{P}D_{G}Johnson.png[Newton(1642-$
$1726)/G.Johnson.]1.5$
$\vec{F} =$
$m\vec{g}$
$\vec{F}:$
$Force\,(N;\,kg\,m\,s^{-2})$
$\vec{a}:$
$Acceleration\,(m\,s^{-2})$
$m:$
$Mass(kg)$
$_{P}D_{G}Johnson.png[Newton(1642-$
$1726)/G.Johnson.]1.5$
$\vec{F} =$
$G\frac{mM}{r^2}\hat{r}$
$\cdot 10^{-11}\,(\,m^3kg^{-1}s^{-2})$
$\hat{r}:$
$unitvector$
$r:$
$distancebetweenpointmasses$
r
$_{P}NAS1798.pngCavnedish, PNAS, 1798$
$_{W}estphal_{N}ature2021.pngWestphaletal., Nature, 2021$

R_E
$g(ms^{-2})$
$g =$
$\frac{d^2}{dt^2}x(t) =$
$\frac{GM}{R_e^2} \approx$
$const.$
$v(ms^{-1})$
$c_1 =$
$\int g dt =$
$\frac{d}{dt}x(t) =$
$\frac{GM}{R_e^2}t +$
c_1
$x(m)$
c_2
$^2 +$
$10;\,[]at(axiscs:$
$5, 100)$
$\int v(t)dt =$
$\frac{GM}{2R_e^2}t^2 +$
$c_1 t +$
$\frac{c_2}{2R_e^2 t^2 + c_1 t + c_2}$
$c1 =$
0
$c_2 =$
0
R_E
$\vec{r}$

$$\vec{F} = G\frac{dM}{r^2}\hat{r}$$

$$\vec{F} = G\frac{dM}{r^2}\hat{r}$$

$$\vec{F}(\vec{r}) = \sum_i G\frac{dM_i}{r_i^2}\hat{r_i}$$