

73. Equating Eq. 14-18 with Eq. 14-10, we find

$$a_{gs} - a_g = \frac{4\pi G\rho R}{3} - \frac{4\pi G\rho r}{3} = \frac{4\pi G\rho(R-r)}{3}$$

which yields $a_{gs} - a_g = 4\pi G\rho D/3$. Since $4\pi G\rho/3 = a_{gs}/R$ this is equivalent to

$$a_{gs} - a_g = a_{gs} \frac{D}{R} \implies a_g = a_{gs} \left(1 - \frac{D}{R}\right) .$$