

8-40) For escape from the solar system,

$$\Delta v_{\text{escape}} = v_e \left\{ 1 - \sqrt{\frac{2r_2}{(r_e + r_2)}} \right\} \Bigg|_{\text{Lim } r_2 \rightarrow \infty}$$

where v_e is the earth's velocity in a helio-centric inertial frame, and r_e is the radius of the earth's orbit in the same system.

$$\text{Thus, } \Delta v_{\text{esc.}} = v_e (\sqrt{2} - 1).$$

For falling into the sun,

$$\Delta v_{\text{sun}} = v_e \left\{ 1 - \sqrt{\frac{2r_1}{(r_e + r_1)}} \right\} \Bigg|_{\text{Lim } r_1 \rightarrow 0} = v_e.$$

Thus, $\Delta v_{\text{sun}} > \Delta v_{\text{esc}}$ and it's easier to escape the solar system than drop into the sun.