

What is 1 AU ?

- | | | |
|---|--|---------------------------------------|
| A | The average Moon-Earth distance - 384,400 km | 0 |
| B | The average Earth-Sun distance - 150 M km | 0 <input checked="" type="checkbox"/> |
| C | The size of the solar system | 0 |
| D | The radius of Jupiter | 0 |

What statement does ***NOT*** apply to the concept of sphere of influence (SOI)?

A Within the SOI, we can consider only the two-body problem to compute the trajectory 0

B To compute the size of the SOI, we study the ratio of the perturbations in an heliocentric frame and in a planetocentric frame 0

C Within the SOI, there are at least two massive bodies 0


D The SOI depends on the average distance of the massive object and their relative mass 0

On a Hohmann transfer from Earth to Venus (i.e. sunwards), what would be the trajectory within Earth's SOI?

A A circle 0

B A parabola 0

C An ellipse 0

D An hyperbola 0 

What is the correct equation for the hyperbolic excess velocity ?

A

.

$$v_d^2 = (v_d^\infty)^2 + v_{Esc}^2$$

0 

B

.

$$v_d = (v_d^\infty) + v_{Esc}$$

0

C

.

$$v_d^2 = (v_d^\infty + v_{Esc})^2 +$$

0

D

.

$$v_d = v_d^\infty$$

0

On a Hohmann transfer from Earth to Venus (i.e. sunwards), how should the departure hyperbolic excess velocity and the Earth's planetary velocity be aligned?

- | | | |
|---|---|---------------------------------------|
| A | Parallel, in the same direction | 0 |
| B | Perpendicular, with the hyperbolic excess velocity pointing away from the Sun | 0 |
| C | Parallel, but in opposite directions | 0 <input checked="" type="checkbox"/> |
| D | Perpendicular, with the hyperbolic excess velocity pointing towards the Sun | 0 |

What is the heliocentric velocity right after leaving the SOI?

A

.

$$V_D = V_P + v^\infty$$

0 

B

.

$$V_D^2 = V_P^2 + (v^\infty)^2$$

0

C

.

$$V_D = V_P + v^\infty - 2v^\infty V_P \cos(\beta)$$

0

D

.

$$V_d^2 = (v_d^\infty)^2 + v_{Esc}^2$$

0

On a Hohmann transfer from Earth to Venus (i.e. sunwards), what would be the trajectory in the heliocentric phase?

A A circle

0

B A parabola

0

C An ellipse

0



D An hyperbola

0

Is the treatment of the arrival phase similar to the departure phase?

A No, it is always an elliptical orbit 0

B Yes, with the arrival hyperbolic excess velocity defining the semi-major axis of the planet ocentric phase 0

C No, it is always a parabolic orbit. 0

D No, the total mecanical energy is not conserved 0

How can the probe get gravitationally bound to the planet on arrival?

A It will always be bound after entering the arrival SOI 0

B It can perform a braking Delta-v using its thrusters 0

C It can perform an aerocapture manoeuvre 0

What is an aerobraking manoeuvre?

A A way to transfer the spacecraft from an hyperbolic to an elliptical orbit by using the drag generated by the atmosphere to reduce the velocity 0

B A way to reduce the apoapsis of an elliptical orbit subject to drag-induced delta Vs at periaapsis. 0

C A way to (re-)enter the atmosphere and reach the surface. 0

D The sequence of thurster-induced delta Vs to sequentially reduce the apogee of an elliptical orbit 0