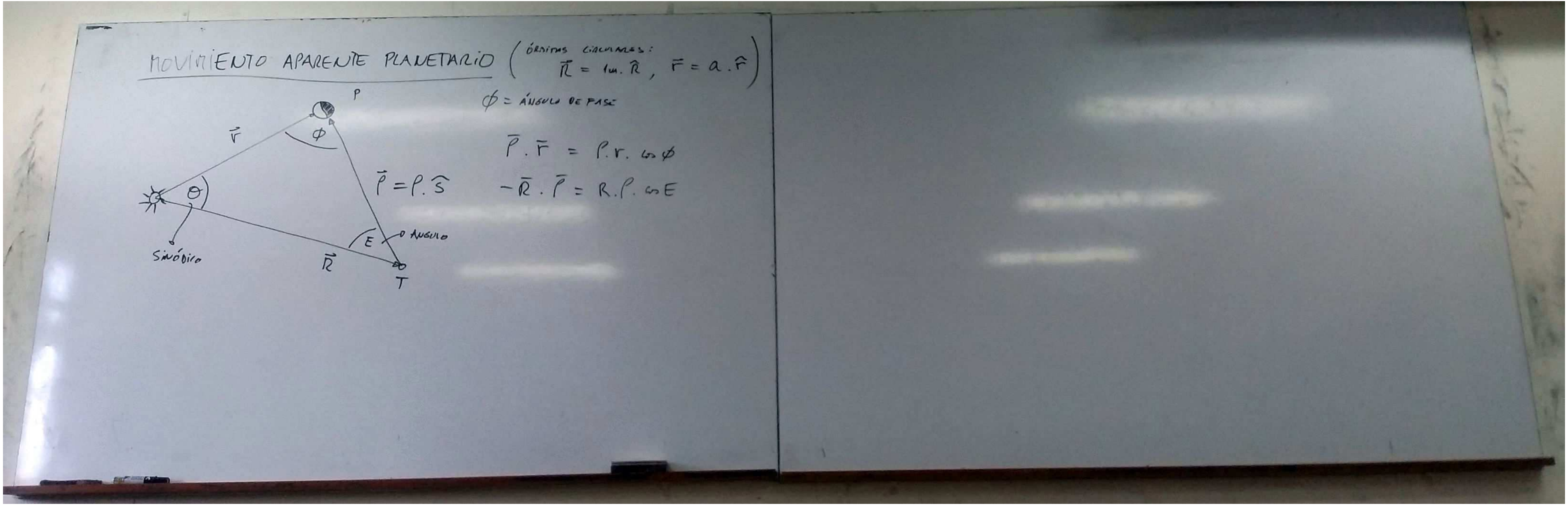
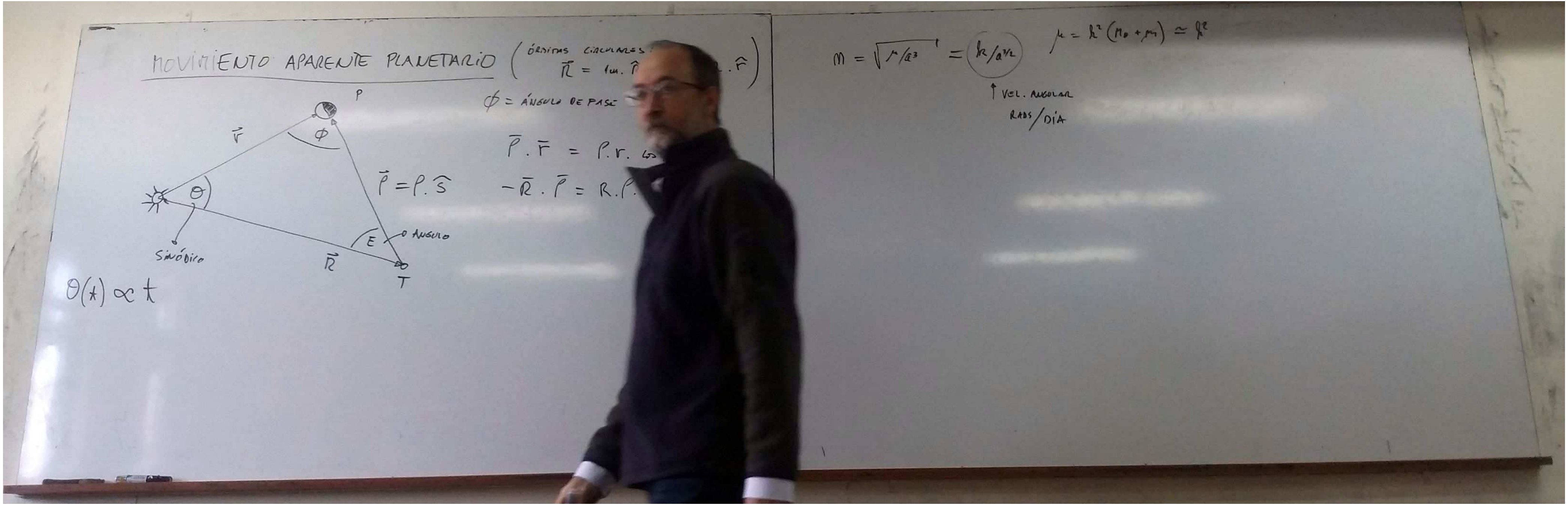
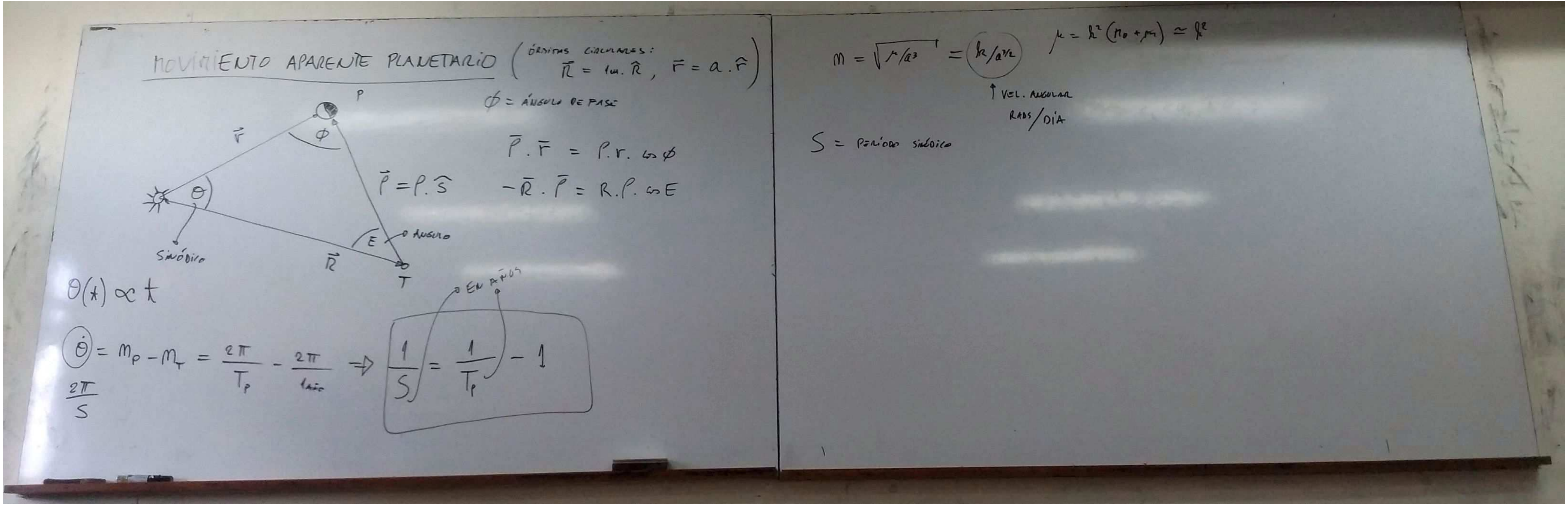
Astronomia Fundamental 2018 - clase 16

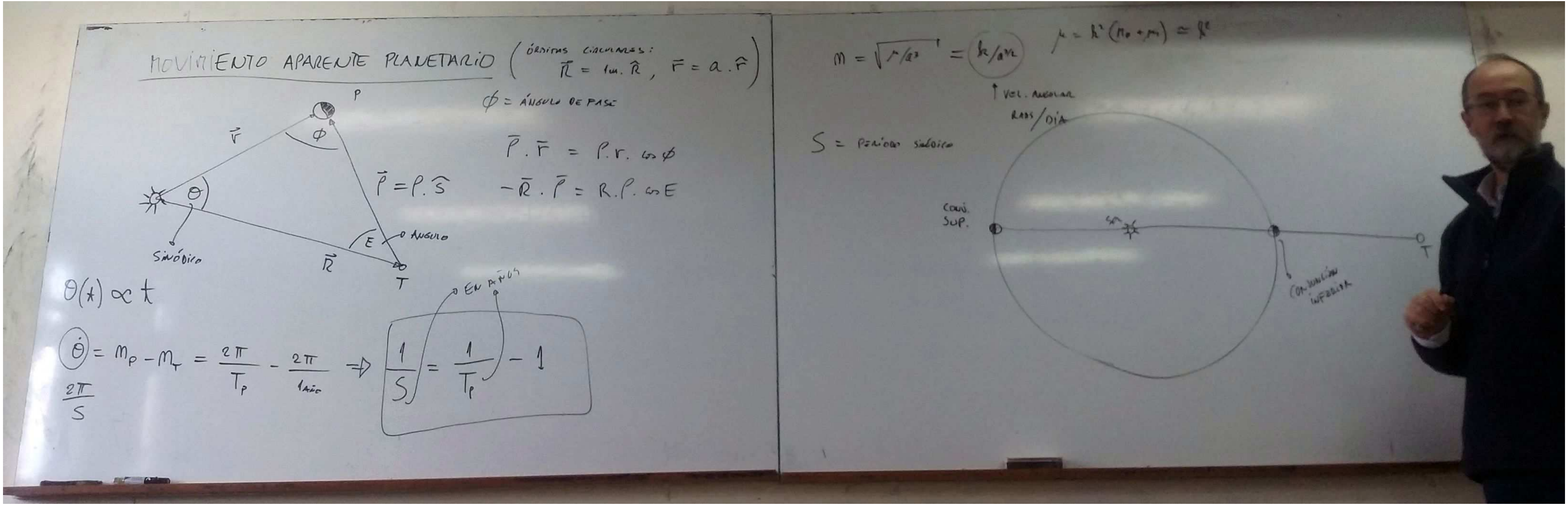


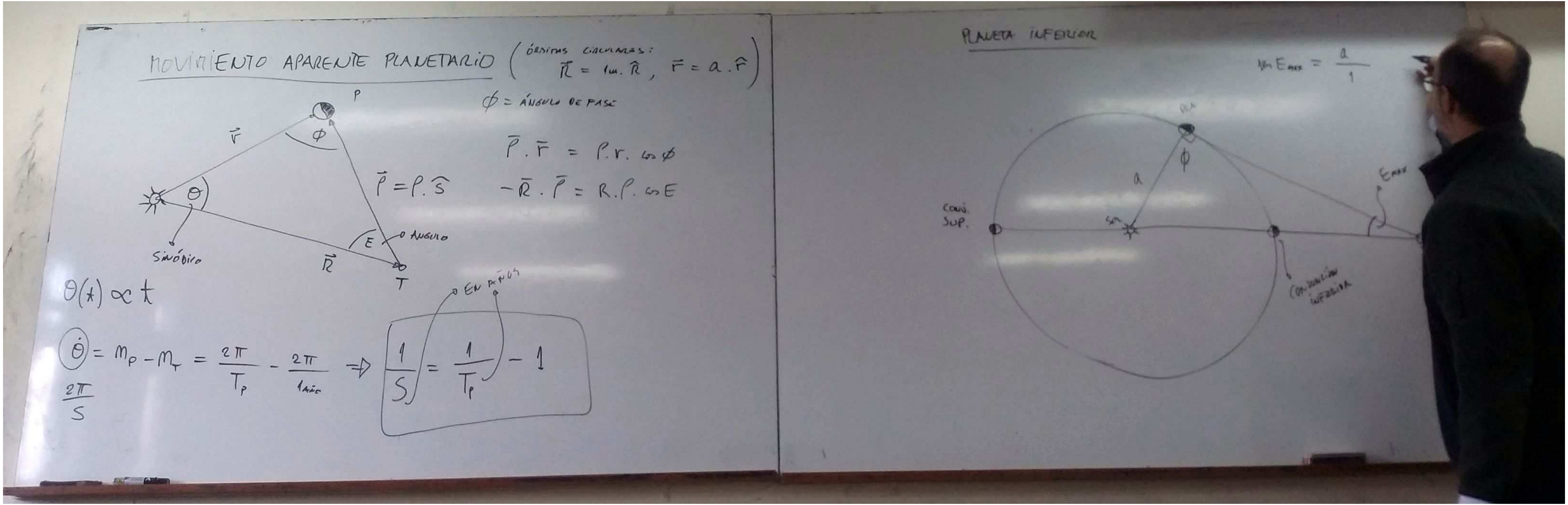
Astronomia Fundamental 2018 - clase 16

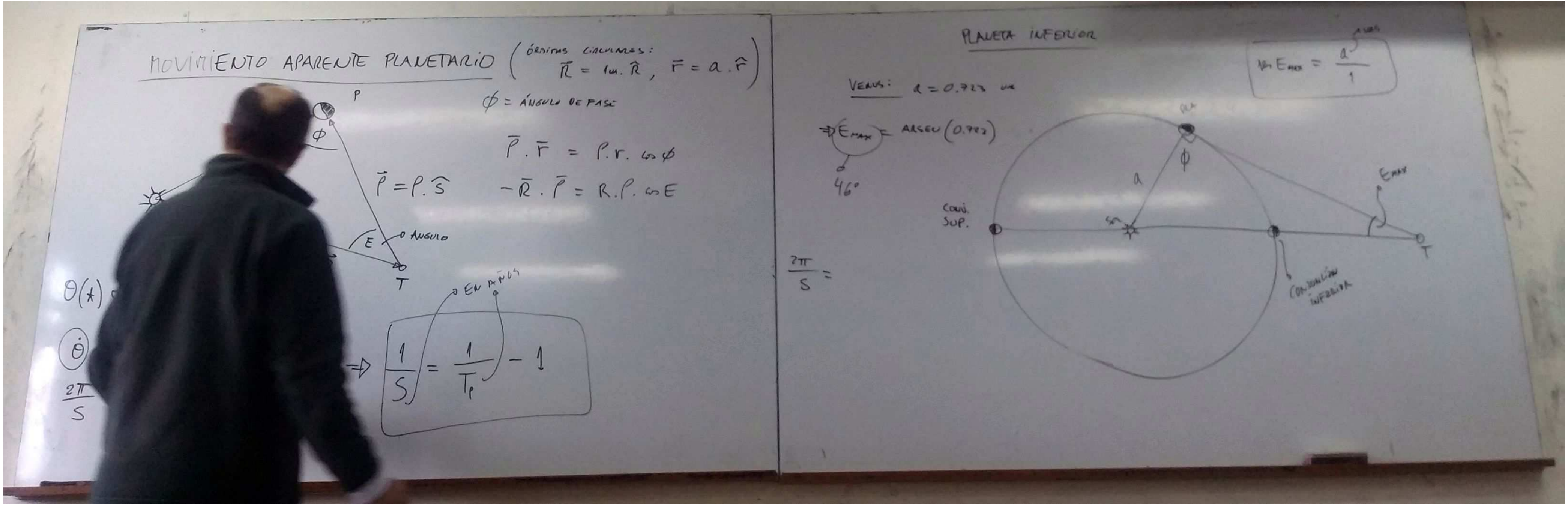


Astronomia Fundamental 2018 - clase 16

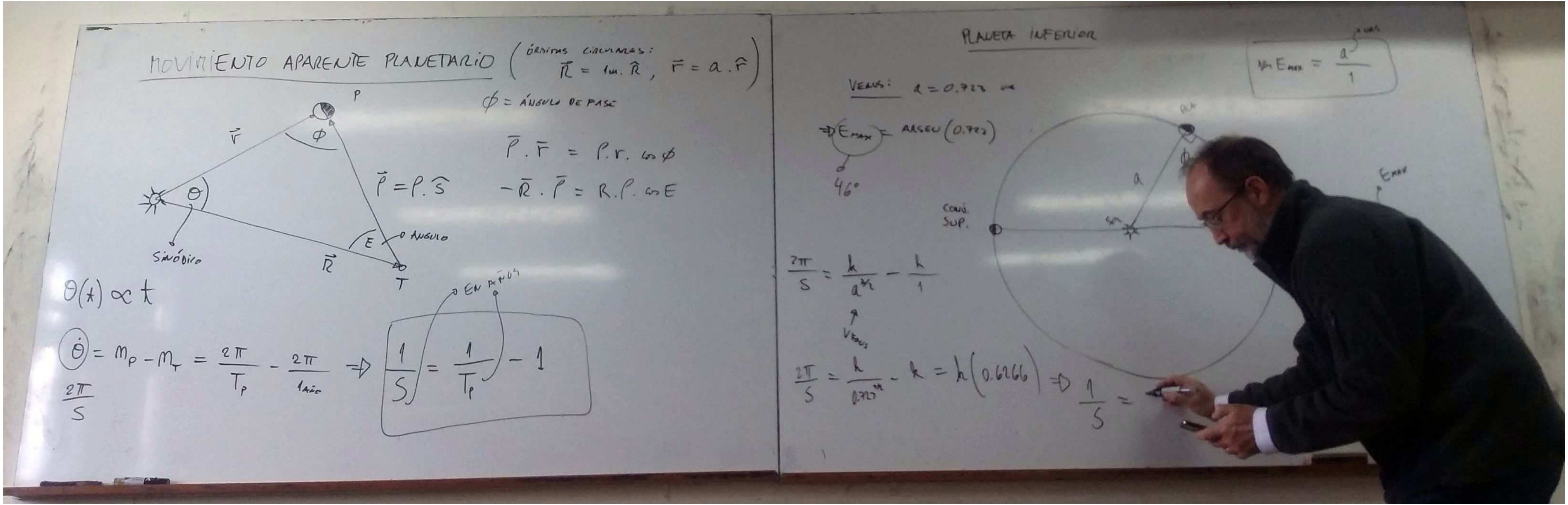



MOVIMIENTO APARENTE PLANETARIO
P
ϕ = ÁNGULO DE FASE
$\bar{P} \cdot \bar{r} = P \cdot r \cdot \cos\phi$
$-\bar{R} \cdot \bar{P} = R \cdot P \cdot \cos E$
$\vec{P} = P \cdot \hat{S}$
SINÓDICO
ÁNGULO
T
$\theta(t) \propto t$
$\dot{\theta} = n_P - n_T = \frac{2\pi}{T_P} - \frac{2\pi}{1 año} \Rightarrow \frac{1}{S} = \frac{1}{T_P} - 1$
$\frac{2\pi}{S}$
EN AÑOS
$\mu = k^2 (m_0 + m_1) \simeq k^2$
VEL. ANGULAR
RADS/DIA
S = PERIODO SINÓDICO
CONJ. SUP.
CONJUNCIÓN INFERIOR
T

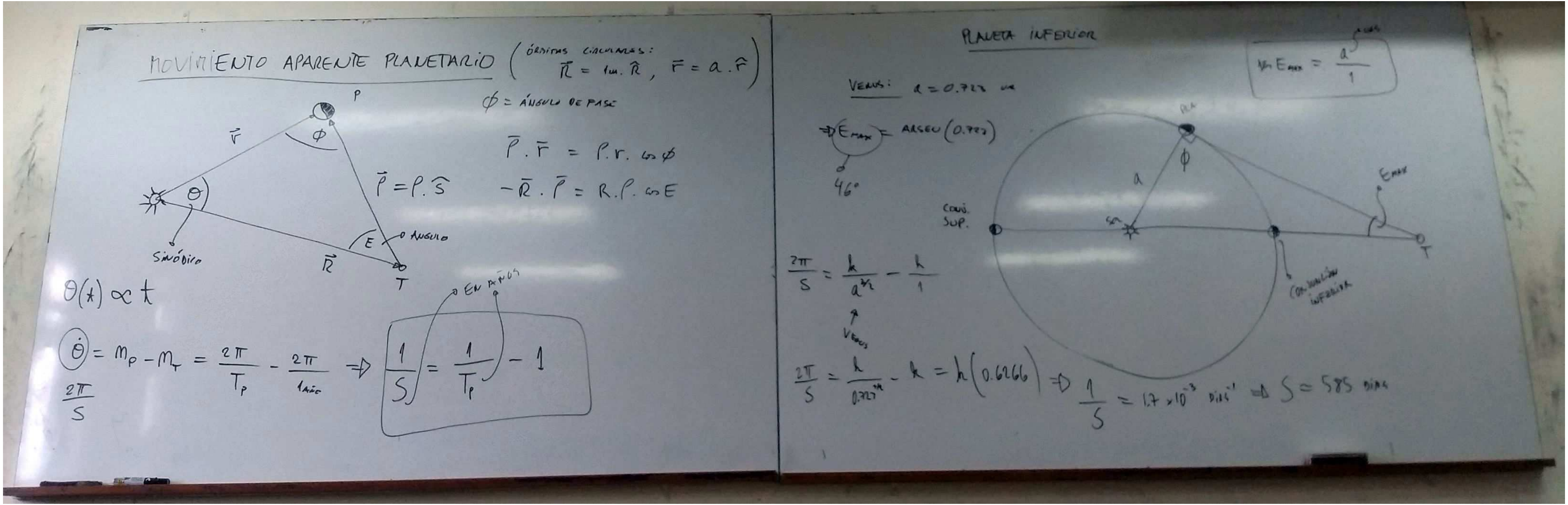

MOVIMIENTO APARENTE PLANETARIO
ÓRBITAS CIRCULARES:
P
ϕ = ÁNGULO DE FASE
SINÓDICO
ÁNGULO
T
EN AÑOS
PLANETA INFERIOR
CONJ. SUP.
CONJUNCIÓN INFERIOR
Emax


MOVIMIENTO APARENTE PLANETARIO
ÓRBITAS CIRCULARES:
φ = ÁNGULO DE FASE
ÁNGULO
EN AÑOS
PLANETA INFERIOR
VENUS: a = 0.723 UA
ARCSEN (0.723)
46°
CONJ. SUP.
CONJUNCIÓN INFERIOR
E MAX
T

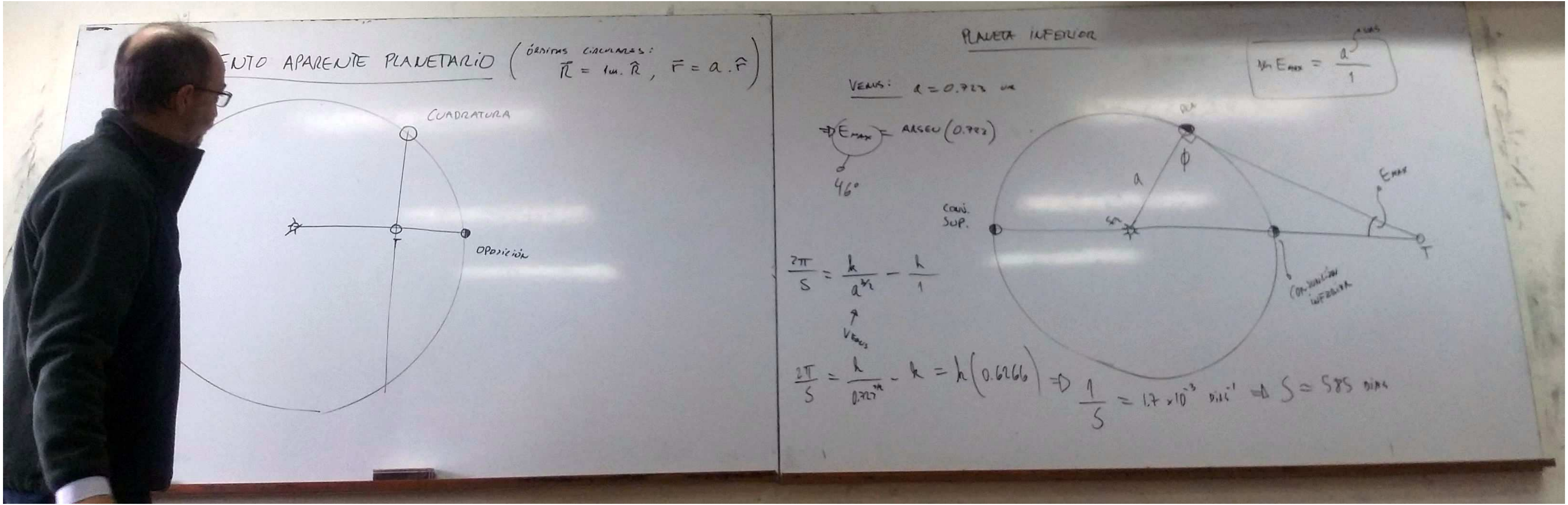
Astronomia Fundamental 2018 - clase 16



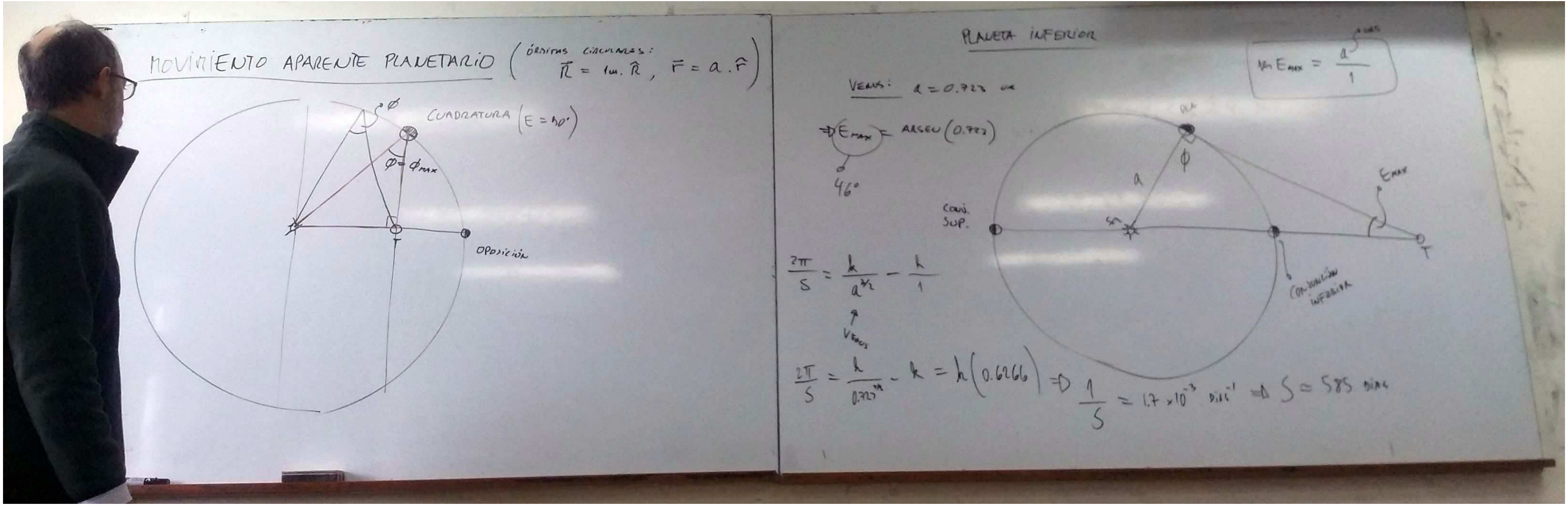
Astronomia Fundamental 2018 - clase 16

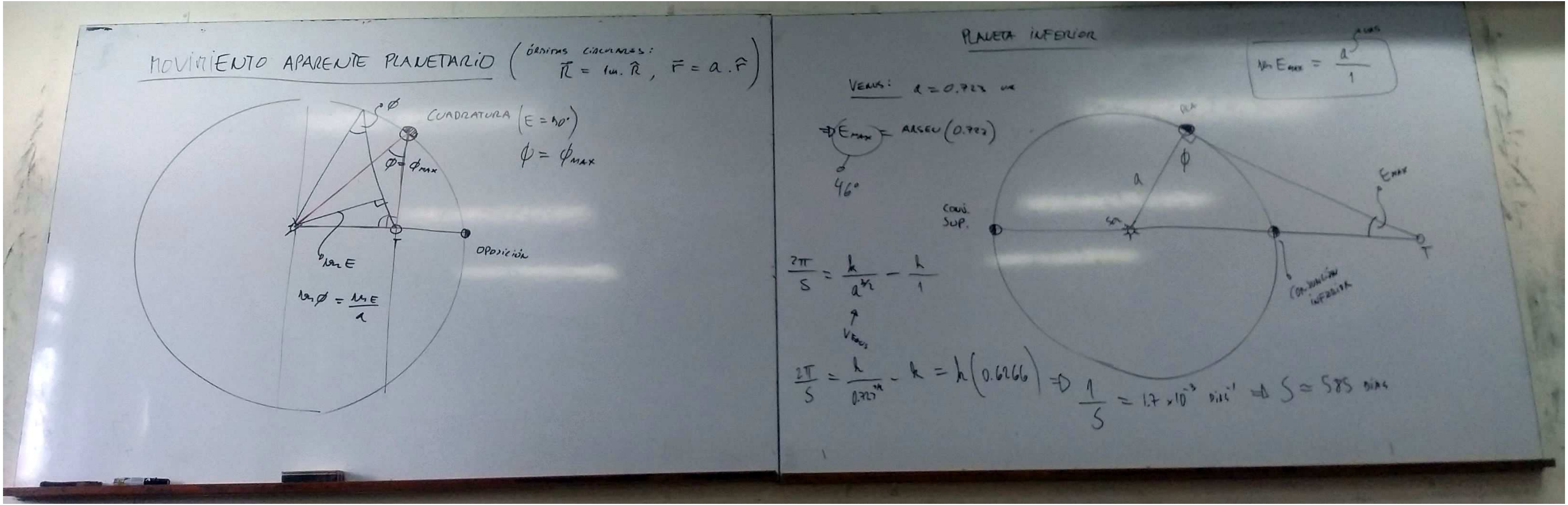


Astronomia Fundamental 2018 - clase 16

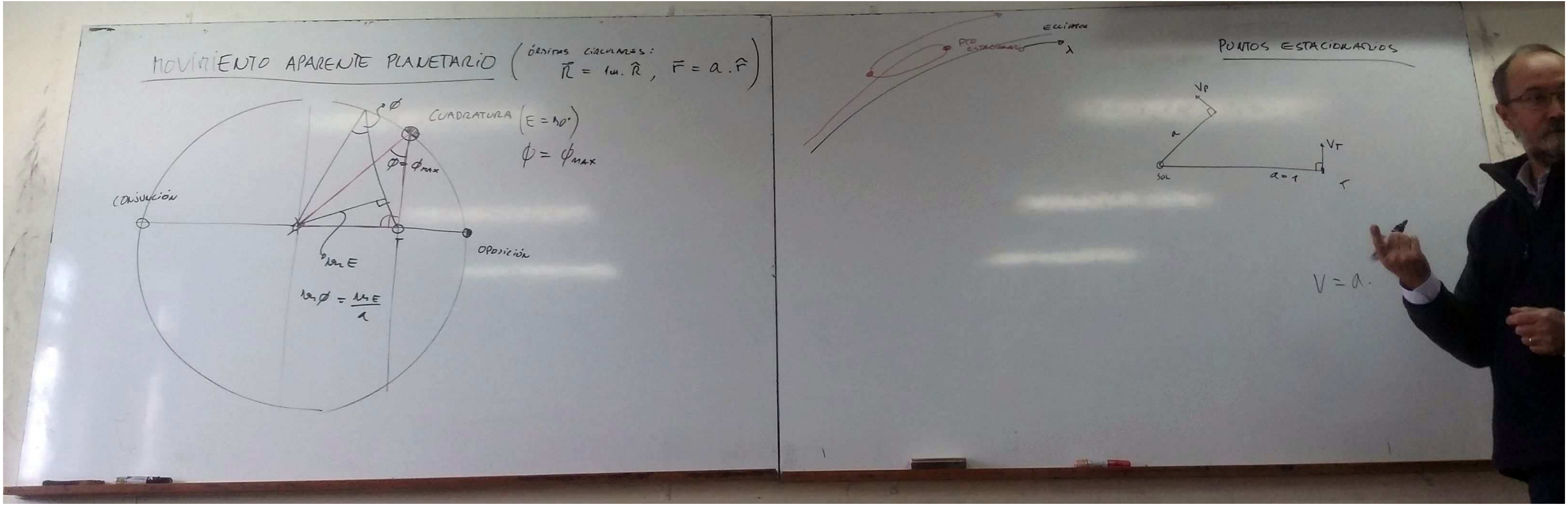


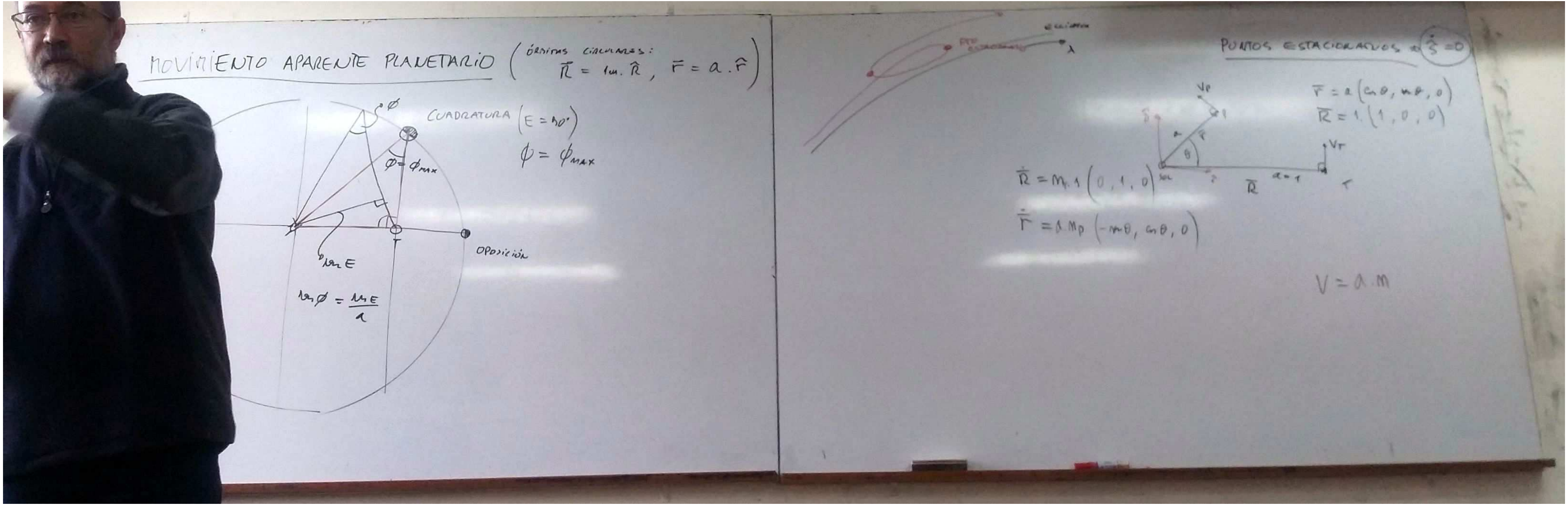
Astronomia Fundamental 2018 - clase 16

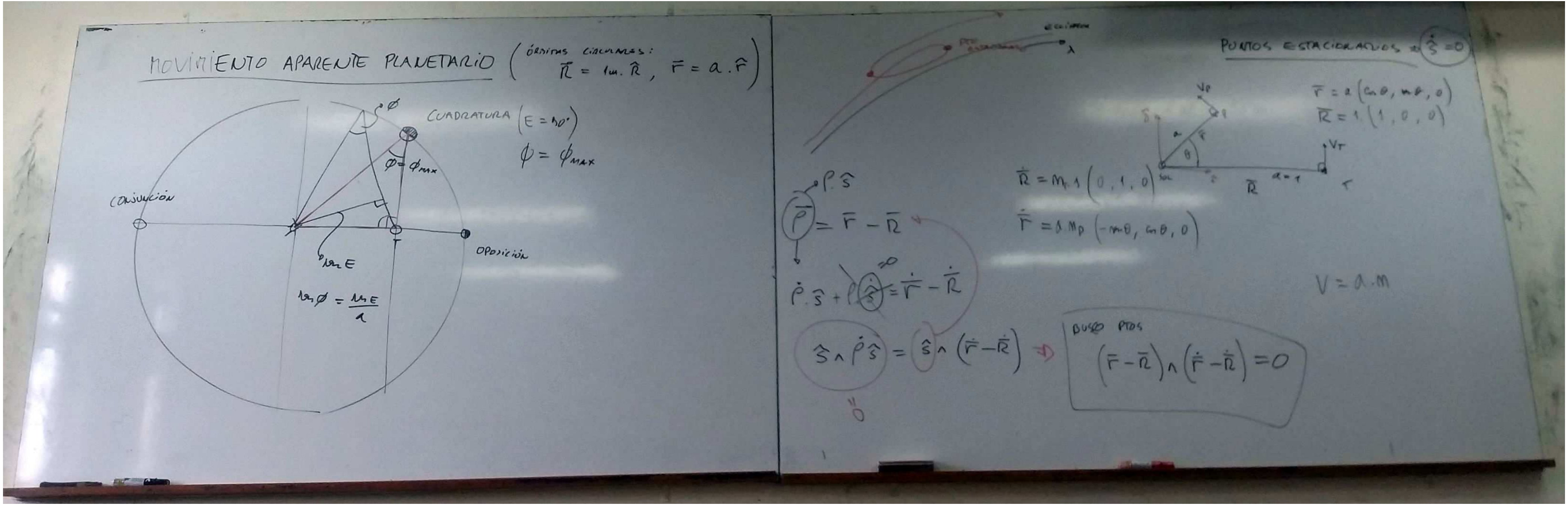



MOVIMIENTO APARENTE PLANETARIO
(ÓRBITAS CIRCULARES: $\vec{R} = 1u.\hat{R}$, $\vec{r} = a.\hat{r}$)
CUADRATURA (E = 90°)
$\phi = \phi_{MAX}$
$\phi = \phi_{MAX}$
T
OPOSICIÓN
sen E
$\sin\phi = \frac{\sin E}{a}$
PLANETA INFERIOR
VENUS: a = 0.723 ua
$\Rightarrow E_{MAX} = \arcsin(0.723)$
46°
$\sin E_{MAX} = \frac{a}{1}$
ϕ
a
CONJ. SUP.
Sol
T
E_{MAX}
CONJUNCIÓN INFERIOR
$\frac{2\pi}{S} = \frac{k}{a^{3/2}} - \frac{k}{1}$
VENUS
$\frac{2\pi}{S} = \frac{k}{0.723^{3/2}} - k = k(0.6266) \Rightarrow \frac{1}{S} = 1.7 \times 10^{-3}$ días^{-1} $\Rightarrow S \simeq 585$ días

Astronomia Fundamental 2018 - clase 16

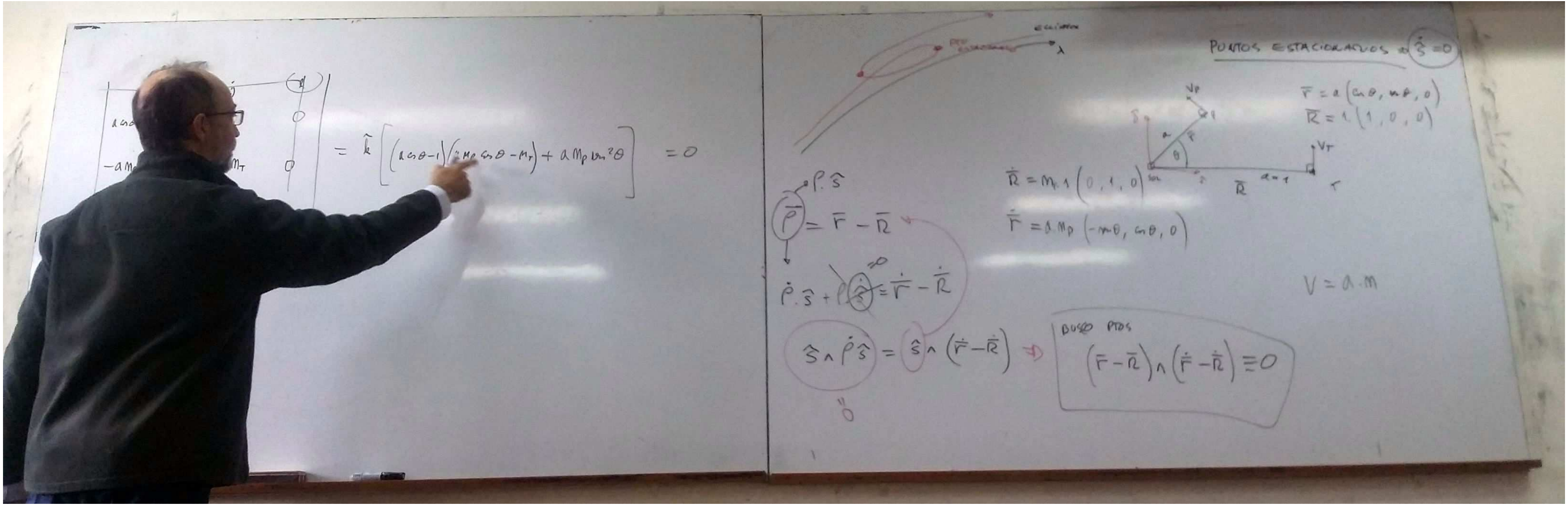



MOVIMIENTO APARENTE PLANETARIO
ÓRBITAS CIRCULARES:
CUADRATURA
OPOSICIÓN
PUNTOS ESTACIONARIOS
V = a.n

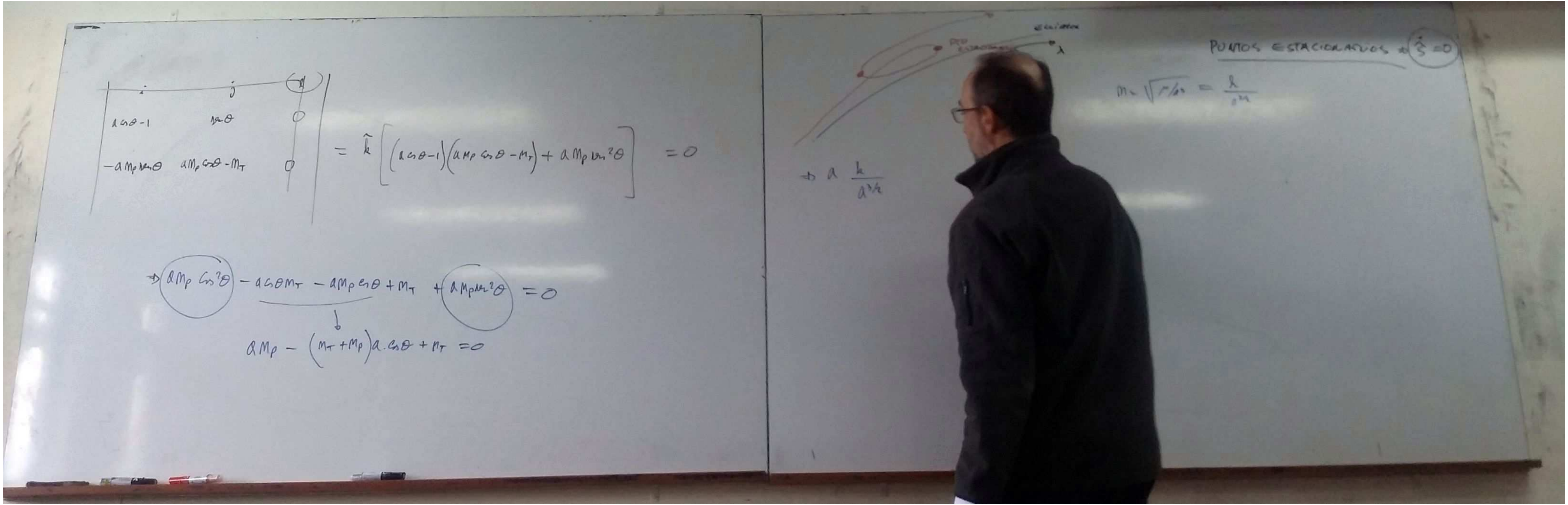

MOVIMIENTO APARENTE PLANETARIO
CUADRATURA
CONJUNCIÓN
OPOSICIÓN
PUNTOS ESTACIONARIOS
BUSCO PTOS

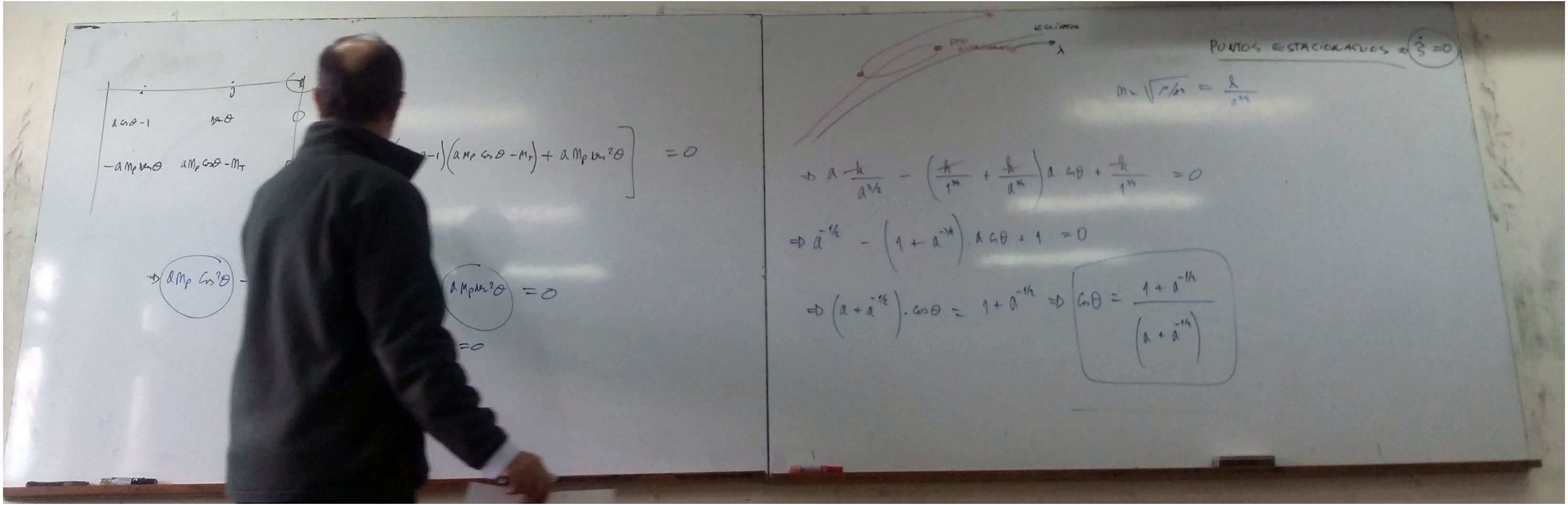
Astronomia Fundamental 2018 - clase 16

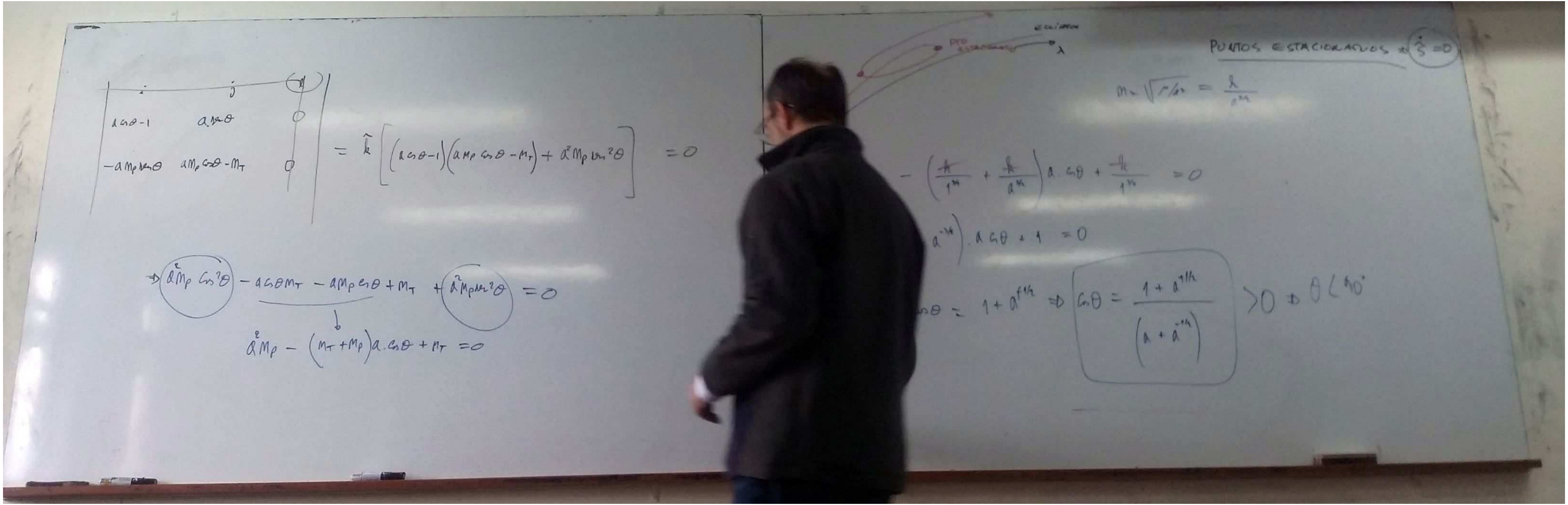
Astronomia Fundamental 2018 - clase 16



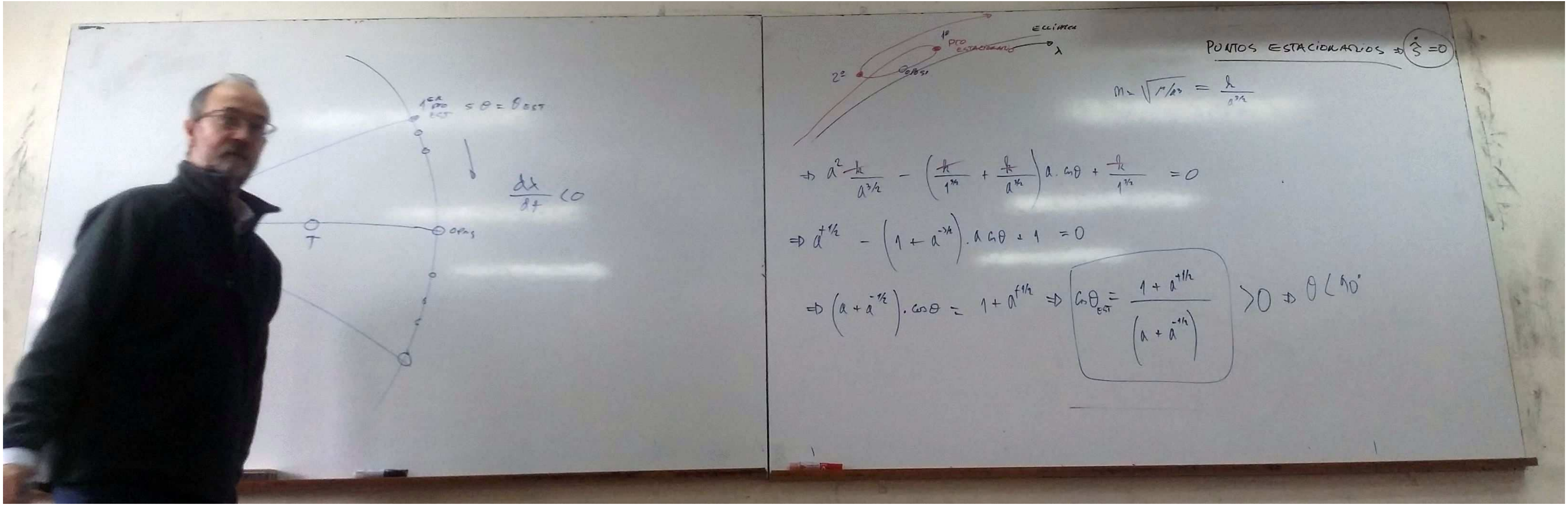
Astronomia Fundamental 2018 - clase 16

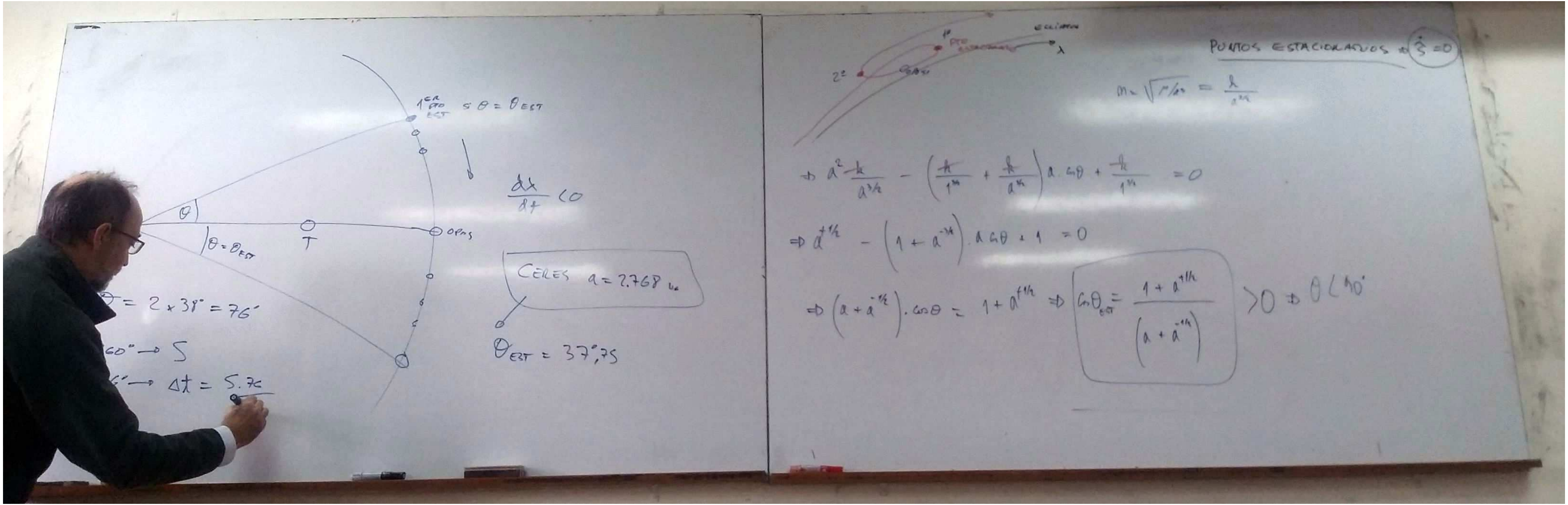


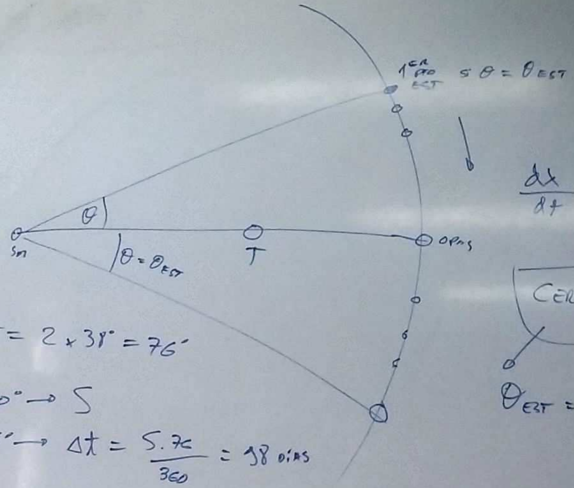

PUNTOS ESTACIONARIOS


PUNTOS ESTACIONARIOS ⇒ $\dot{S} = 0$
eclíptica
λ
$= \hat{k}\left[(a\cos\theta - 1)(a M_P \cos\theta - M_T) + a^2 M_P \sin^2\theta\right] = 0$
$\Rightarrow a^2 M_P \cos^2\theta - a\cos\theta M_T - a M_P \cos\theta + M_T + a^2 M_P \sin^2\theta = 0$
$a^2 M_P - (M_T + M_P)\, a \cos\theta + M_T = 0$
$\cos\theta = \frac{1 + a^{+1/k}}{(a + a^{-1/k})} > 0 \Rightarrow \theta < 90°$

Astronomia Fundamental 2018 - clase 16




PUNTOS ESTACIONARIOS
CERES a = 2.768 ua
$\theta_{EST} = 37°,75$
$\frac{d\lambda}{dt} < 0$
OPOS
T
$\Delta t = 5.76$



$\Delta\theta = 2 \times 38° = 76°$

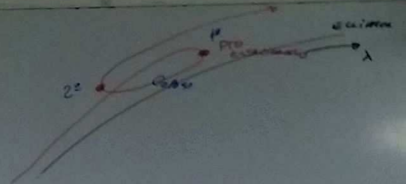
$\Delta\theta = 360° \longrightarrow S$

$76° \longrightarrow \Delta t = \frac{S.76}{360} = 98$ días

$\frac{d\lambda}{dt} < 0$

CERES $a = 2.768$ ua

$\theta_{EST} = 37°,75$



PUNTOS ESTACIONARIOS $\Rightarrow \dot{S} = 0$

$n = \sqrt{\mu/a^3} = \frac{k}{a^{3/2}}$

$\Rightarrow a^2 \frac{k}{a^{3/2}} - \left(\frac{k}{1^{1/2}} + \frac{k}{a^{1/2}}\right) a \cos\theta + \frac{k}{1^{1/2}} = 0$

$\Rightarrow a^{+1/2} - \left(1 + a^{-1/2}\right) a \cos\theta + 1 = 0$

$\Rightarrow \left(a + a^{-1/2}\right) \cos\theta = 1 + a^{+1/2} \Rightarrow \cos\theta_{EST} = \frac{1 + a^{+1/2}}{\left(a + a^{+1/2}\right)} > 0 \Rightarrow \theta < 90°$

Astronomia Fundamental 2018 - clase 16