

宇田雄一「古典物理学」

【1d10】とは【1d10a】and【1d10b】のことだ。

$$【1d10a】 -Z_0 + am(1,1) < Qm(2,1) < 0$$

【1d10b】  $\forall t \in \mathbb{R}$ ; [  $t \leq 0 \Rightarrow$  【1d10b1】 ] and [  $t \geq 0 \Rightarrow$  【1d10b2】 ]

【1d10b1】  $\exists z \in \mathbb{R}$ ;  $z = r(t) - Qm(2,1)/E$  and

$$t = -\frac{1}{\alpha} \sqrt{\alpha z^2 + 2\beta z + c} + \frac{\beta}{\alpha \sqrt{\alpha}} \cosh^{-1} \left( \frac{\alpha z + \beta}{\sqrt{\beta^2 - \alpha c}} \right)$$

$$\text{and } \theta(t) = -\frac{h}{\sqrt{-\alpha'}} \cos^{-1} \left( \frac{-\alpha'/r(t) - \beta'}{\sqrt{\beta'^2 - \alpha' A}} \right)$$

【1d10b2】  $\exists z \in \mathbb{R}$ ;  $z = r(t) - Qm(2,1)/E$  and

$$t = \frac{1}{\alpha} \sqrt{\alpha z^2 + 2\beta z + c} - \frac{\beta}{\alpha \sqrt{\alpha}} \cosh^{-1} \left( \frac{\alpha z + \beta}{\sqrt{\beta^2 - \alpha c}} \right)$$

$$\text{and } \theta(t) = -\frac{h}{\sqrt{-\alpha'}} \cos^{-1} \left( \frac{-\alpha'/r(t) - \beta'}{\sqrt{\beta'^2 - \alpha' A}} \right)$$

【1d11】とは【1d11a】and【1d11b】のことだ。

$$【1d11a】 0 < Qm(2,1) < ab Z_0$$

【1d11b】  $\forall t \in \mathbb{R}$ ; [  $t \leq 0 \Rightarrow$  【1d11b1】 ] and [  $t \geq 0 \Rightarrow$  【1d11b2】 ]

【1d11b1】  $\exists z \in \mathbb{R}$ ;  $z = r(t) - Qm(2,1)/E$  and

$$t = -\frac{1}{\alpha} \sqrt{\alpha z^2 + 2\beta z + c} + \frac{\beta}{\alpha \sqrt{\alpha}} \cosh^{-1} \left( \frac{\alpha z + \beta}{\sqrt{\beta^2 - \alpha c}} \right)$$

$$\text{and } \theta(t) = -\frac{h}{\sqrt{-\alpha'}} \cos^{-1} \left( \frac{-\alpha'/r(t) - \beta'}{\sqrt{\beta'^2 - \alpha' A}} \right)$$

【1d11b2】  $\exists z \in \mathbb{R}$ ;  $z = r(t) - Qm(2,1)/E$  and

$$t = \frac{1}{\alpha} \sqrt{\alpha z^2 + 2\beta z + c} - \frac{\beta}{\alpha \sqrt{\alpha}} \cosh^{-1} \left( \frac{\alpha z + \beta}{\sqrt{\beta^2 - \alpha c}} \right)$$

$$\text{and } \theta(t) = -\frac{h}{\sqrt{-\alpha'}} \cos^{-1} \left( \frac{-\alpha'/r(t) - \beta'}{\sqrt{\beta'^2 - \alpha' A}} \right)$$