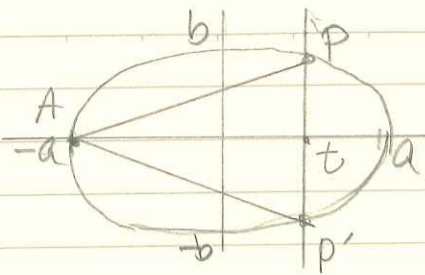


図 13



$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

$$x = t \quad y^2 = b^2 \left(1 - \frac{t^2}{a^2}\right)$$

$$z = \frac{1}{2} (a+t) \times 2b \sqrt{1 - \frac{t^2}{a^2}}$$

$$= b(a+t) \left(1 - \frac{t^2}{a^2}\right)^{\frac{1}{2}}$$

$$\frac{dz}{dt} = b \left(1 - \frac{t^2}{a^2}\right)^{\frac{1}{2}} + b(a+t) \cdot \frac{1}{2} \left(1 - \frac{t^2}{a^2}\right)^{-\frac{1}{2}} \times \left(-\frac{2t}{a^2}\right)$$

$$= \frac{b \left(1 - \frac{t^2}{a^2}\right) + b(a+t) \cdot \left(-\frac{t}{a^2}\right)}{\left(1 - \frac{t^2}{a^2}\right)^{\frac{3}{2}}}$$

$$b - \frac{bt^2}{a^2} - \frac{bt}{a} - \frac{bt^2}{a^2} = \frac{1}{a^2} (a^2b - 2bt^2 - abt)$$

$$2bt^2 + abt - a^2b$$

$$= -b(2t-a)(t+a)$$

$$b(2t^2 + at - a^2)$$

$$b(2t-a)(t+a)$$

$$t \quad -a \quad \frac{a}{2} \quad a$$

$$a^2 - t^2 > 0 \quad -a < t < a$$



$t = \frac{a}{2}$ の時に z は極大値

$$z = b \left(\frac{3}{2}a\right) \left(1 - \frac{1}{4}\right)^{\frac{1}{2}} = ab \times \frac{3\sqrt{3}}{4}$$

$a=3, b=2$ の場合 $\frac{x^2}{9} + \frac{y^2}{4} = 1$, $z = 2(3+x) \left(1 - \frac{x^2}{9}\right)^{\frac{1}{2}}$

$$\frac{dz}{dx} = \frac{-2(2x-3)(x+3)}{\sqrt{1 - \frac{x^2}{9}}}$$

