$$r^2 = r^2\cos^2\theta + r^2\sin^2\theta$$
$$= q_1^2 + q_2^2$$

$$r\frac{dr}{dt} = q_1\frac{dq_1}{dt} + q_2\frac{dq_2}{dt} = q_1 P_1 + q_2 P_2$$
$$= q_1\left(\frac{P_r}{r}q_1 - \frac{P_\theta}{r}q_2\right) + q_2\left(\frac{P_r}{r}q_2 + \frac{P_\theta}{r}q_1\right)$$
$$= \frac{P_r}{r}(q_1^2 + q_2^2) = \frac{P_r}{r}r^2 = P_r r$$
$$\boxed{\therefore\ \frac{dr}{dt} = P_r}$$
□

$$\therefore\ \dot{\varphi} = \frac{A_0}{r^2} \qquad (1.23)$$

$$-r\sin\theta\frac{d\theta}{dt} = \frac{dq_1}{dt} = P_1 = \frac{P_r}{r}q_1 - \frac{P_\theta}{r}q_2$$
$$= P_r\cos\theta - P_\theta\sin\theta$$
$$-r\sin^2\theta\frac{d\theta}{dt} = P_r\cos\theta\sin\theta - P_\theta\sin^2\theta \qquad \cdots ①$$
$$r\cos\theta\frac{d\theta}{dt} = \frac{dq_2}{dt} = P_2 = \frac{P_r}{r}q_2 + \frac{P_\theta}{r}q_1$$
$$= P_r\sin\theta + P_\theta\cos\theta$$
$$r\cos^2\theta\frac{d\theta}{dt} \quad P_r\sin\theta\cos\theta + P_\theta\cos^2\theta \qquad \cdots ②$$

$$② - ① \qquad r\frac{d\theta}{dt} = P_\theta \qquad \boxed{\therefore\ \frac{d\theta}{dt} = \frac{P_\theta}{r}}$$

$A_0 = rP_\theta$ より. $\qquad \dot{\theta} = \dfrac{A_0}{r^2} = \dot{\varphi} \qquad$ (by (1.23))

$\therefore\ \varphi - \theta = C$: 定数

座標軸を回転 $\qquad \varphi - \theta \equiv 0$.