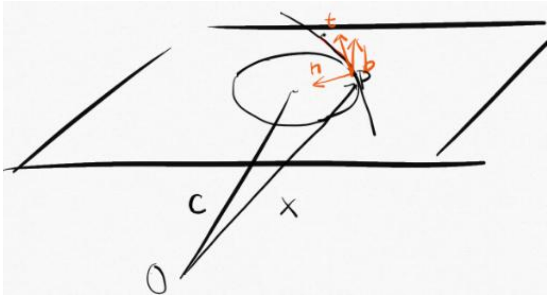
密切平面 $(X-x,\dot{x},\ddot{x})=0$

假設密切圓圓心 c，則 $(c-X,X',X'')=0$



$(X-c)\cdot(X-c)=r^2$ 通過

$P(x(s_0)),Q(x(s_1)),R(x(s_2))$

設 $f(s)=(X-c)\cdot(X-c)-r^2$

$f'(s)=0, f''(s)=0$ Roll 定理

$(X-c)\cdot X'=0$......(1)

$(X-c)\cdot X''+X'\cdot X'=0$

$(X-c)\cdot X''=-1$......(2)

因為 $(c-X,X',X'')=0$，$X-c=\lambda X'+\mu X''$，由(1) $\lambda=0$

由(2)，及 $X''\cdot X''=\kappa^2$

$\mu\kappa^2=-1$，$\mu=\dfrac{-1}{\kappa^2}$，$X''=t'=\kappa n$

$$c=X-\mu X''=X+\frac{1}{\kappa^2}X''=X+\frac{1}{\kappa}n$$

所以密切圓的半徑=$\dfrac{1}{\kappa}$