$\dot{x}=\omega\sin\alpha\left(Ae^{\omega\sin\alpha t}-Be^{-\omega\sin\alpha t}\right)=\dot{x}(t).$

由(7)第一式得出 $\ddot{x}'-(\omega\sin\alpha)^2x'=0$，$\ddot{x}'=\frac{d\dot{x}'}{dt}=\cancel{\dot{x}'\frac{d\dot{x}'}{dx'}}\ \dot{x}'\frac{d\dot{x}'}{dx'}=(\omega\sin\alpha)^2x'$

$\cancel{\dot{x}d\dot{x}}\ \dot{x}'d\dot{x}'=(\omega\sin\alpha)^2x'dx'$，$\dot{x}'^2=(\omega\sin\alpha)^2x'^2+C.$

由 $t=0$ 时，$x=0$，$\dot{x}=0$，$\dot{x}'=\dot{x}=0$，$x'=x+k=k$.

$\therefore C=-k^2(\omega\sin\alpha)^2$，$\dot{x}'^2=(\omega\sin\alpha)^2(x'^2-k^2)$

$\dot{x}^2=(\omega\sin\alpha)^2[(x+k)^2-k^2]=(\omega\sin\alpha)^2(x+2k)x.$

$\dot{x}=\sqrt{(\omega\sin\alpha)^2\left(x+\frac{2g\cos\alpha}{\omega^2\sin^2\alpha}\right)x}=\sqrt{(\omega^2x\sin^2\alpha+2g\cos\alpha)x}$ (9)

由(7)式第二式，得 $F_{Ny}=mg\sin\alpha-m\omega^2x\sin\alpha\cos\alpha$

$\dot{x}=\sqrt{(\omega\sin\alpha)^2\left(x+\frac{2g\cos\alpha}{\omega^2\sin^2\alpha}\right)x}=\sqrt{(\omega^2\sin^2\alpha x+2g\cos\alpha)x}$ (9).

$\Rightarrow F_{Nz}=-2m\omega\sin\alpha\sqrt{(2g\cos\alpha+\omega^2x\sin^2\alpha)x}$

把 $x=s$ 代入质点对圆锥槽的作用力：

$\vec{F}_{N'}=\cancel{0}-F_{Ny}\vec{j}-F_{Nz}\vec{k}$

$=mg\sin\alpha(\omega^2x\cos\alpha-g)\vec{j}+2m\omega\sin\alpha\sqrt{\omega^2x^2\sin^2\alpha+2gx\cos\alpha}\,\vec{k}$