$$m\left(\frac{a^2}{4}+\frac{1}{4}l^2\left(\sqrt{1-\left(\frac{x}{l}+\sin\varphi_{10}\right)^2}+\sqrt{1-\left(\frac{x}{l}+\sin\varphi_{20}\right)^2}\right)^2\right)\ddot{\theta}$$

$$-\frac{1}{2}ml^2\left(\sqrt{1-\left(\frac{x}{l}+\sin\varphi_{10}\right)^2}+\sqrt{1-\left(\frac{x}{l}+\sin\varphi_{20}\right)^2}\right)\left(\frac{\left(\frac{x}{l}+\sin\varphi_{10}\right)\frac{\dot{x}}{l}}{\sqrt{1-\left(\frac{x}{l}+\sin\varphi_{10}\right)^2}}+\frac{\left(\frac{x}{l}+\sin\varphi_{20}\right)\frac{\dot{x}}{l}}{\sqrt{1-\left(\frac{x}{l}+\sin\varphi_{20}\right)^2}}\right)\dot{\theta}$$

$$+\frac{1}{4}\left(\begin{array}{l}-4k\lambda(\beta+\theta\lambda-\phi_{40})-2mga\cos\alpha\cos\theta+2mgl\cos\alpha\sin\theta\left(\sqrt{1-\left(\frac{x}{l}+\sin\varphi_{10}\right)^2}+\sqrt{1-\left(\frac{x}{l}+\sin\varphi_{20}\right)^2}\right)\\ \qquad+\dfrac{4kx\left(-\beta+\arccos\left[\sqrt{1-\left(\frac{x}{l}+\sin\varphi_{10}\right)^2}+\frac{x\tan\theta}{l}\right]\right)\sec^2\theta}{l\sqrt{1-\left(\sqrt{1-\left(\frac{x}{l}+\sin\varphi_{10}\right)^2}+\frac{x\tan\theta}{l}\right)^2}}\end{array}\right)=0$$