$$2\,L_1\,\mathrm{Lc}_2\,\cos\left(\varphi_2\right)\,\dot{\varphi}_1 + L_1\,\mathrm{Lc}_2\,\cos\left(\varphi_2\right)\,\dot{\varphi}_2$$

$$\frac{d}{dt}$$

$$2\,L_1\,\mathrm{Lc}_2\,\cos\left(\varphi_2\right)\,\ddot{\varphi}_1 - L_1\,\mathrm{Lc}_2\,\sin\left(\varphi_2\right)\,\left(\dot{\varphi}_2\right)^2 + L_1\,\mathrm{Lc}_2\,\cos\left(\varphi_2\right)\,\ddot{\varphi}_2 - L_1\,\mathrm{Lc}_2\,\sin\left(\varphi_2\right)\,\dot{\varphi}_2\,\dot{\varphi}_1\,2$$

$$L_1 \, \mathrm{Lc}_2 \, \cos(\varphi_2) \, \dot{\varphi}_2$$

$$\frac{d}{dt}$$

$$L_1 \, \mathrm{Lc}_2 \, \cos(\varphi_2) \, \ddot{\varphi}_2 - L_1 \, \mathrm{Lc}_2 \, \sin(\varphi_2) \, (\dot{\varphi}_2)^2$$

$$2 \, L_1 \, \mathrm{Lc}_2 \, \cos(\varphi_2) \, \dot{\varphi}_1$$

$$\frac{d}{dt}$$

$$2 \, L_1 \, \mathrm{Lc}_2 \, \cos(\varphi_2) \, \ddot{\varphi}_1 - L_1 \, \mathrm{Lc}_2 \, \sin(\varphi_2) \, \dot{\varphi}_2 \, \dot{\varphi}_1 \, 2$$