$$\dot{\theta}\,\mathrm{v_y} -$$
$$\frac{2\,\mathrm{C_{rx}}}{m} -$$
$$\frac{2\,\mathrm{C_{fx}}\,\cos\left(\delta_\mathrm{f}\right)}{m} +$$
$$\frac{\mathrm{C_{rx}}\,\mathrm{r_w}\,\omega_\mathrm{rl}}{m\,\mathrm{v_x} - m\,\dot{\theta}\,w} +$$
$$\frac{\mathrm{C_{rx}}\,\mathrm{r_w}\,\omega_\mathrm{rr}}{m\,\mathrm{v_x} + m\,\dot{\theta}\,w} +$$
$$\frac{\mathrm{C_{fy}}\,\mathrm{atan2}\left(\mathrm{v_y}\,\cos\left(\delta_\mathrm{f}\right) - \mathrm{v_x}\,\sin\left(\delta_\mathrm{f}\right) + \mathrm{l_f}\,\dot{\theta}\,\cos\left(\delta_\mathrm{f}\right) - \dot{\theta}\,w\,\sin\left(\delta_\mathrm{f}\right), \mathrm{v_x}\,\cos\left(\delta_\mathrm{f}\right) + \mathrm{v_y}\,\sin\left(\delta_\mathrm{f}\right) + \dot{\theta}\,w\,\cos\left(\delta_\mathrm{f}\right) + \mathrm{l_f}\,\dot{\theta}\,\sin\left(\delta_\mathrm{f}\right)\right)\,\sin\left(\delta_\mathrm{f}\right)}{m} +$$
$$\frac{\mathrm{C_{fy}}\,\mathrm{atan2}\left(\mathrm{v_y}\,\cos\left(\delta_\mathrm{f}\right) - \mathrm{v_x}\,\sin\left(\delta_\mathrm{f}\right) + \mathrm{l_f}\,\dot{\theta}\,\cos\left(\delta_\mathrm{f}\right) + \dot{\theta}\,w\,\sin\left(\delta_\mathrm{f}\right), \mathrm{v_x}\,\cos\left(\delta_\mathrm{f}\right) + \mathrm{v_y}\,\sin\left(\delta_\mathrm{f}\right) - \dot{\theta}\,w\,\cos\left(\delta_\mathrm{f}\right) + \mathrm{l_f}\,\dot{\theta}\,\sin\left(\delta_\mathrm{f}\right)\right)\,\sin\left(\delta_\mathrm{f}\right)}{m} +$$
$$\frac{\mathrm{C_{fx}}\,\mathrm{r_w}\,\omega_\mathrm{fl}\,\cos\left(\delta_\mathrm{f}\right)}{m\,\mathrm{v_x}\,\cos\left(\delta_\mathrm{f}\right) + m\,\mathrm{v_y}\,\sin\left(\delta_\mathrm{f}\right) - m\,\dot{\theta}\,w\,\cos\left(\delta_\mathrm{f}\right) + \mathrm{l_f}\,m\,\dot{\theta}\,\sin\left(\delta_\mathrm{f}\right)} +$$
$$\frac{\mathrm{C_{fx}}\,\mathrm{r_w}\,\omega_\mathrm{fr}\,\cos\left(\delta_\mathrm{f}\right)}{m\,\mathrm{v_x}\,\cos\left(\delta_\mathrm{f}\right) + m\,\mathrm{v_y}\,\sin\left(\delta_\mathrm{f}\right) + m\,\dot{\theta}\,w\,\cos\left(\delta_\mathrm{f}\right) + \mathrm{l_f}\,m\,\dot{\theta}\,\sin\left(\delta_\mathrm{f}\right)}$$

$$- \frac{\mathrm{C_{fx}}\, \mathrm{r_w}\, \omega_{\mathrm{fl}}\, \sin\left(\delta_{\mathrm{f}}\right)}{m\, \mathrm{v_x}\, \cos\left(\delta_{\mathrm{f}}\right) + m\, \mathrm{v_y}\, \sin\left(\delta_{\mathrm{f}}\right) - m\, \dot{\theta}\, w\, \cos\left(\delta_{\mathrm{f}}\right) + \mathrm{l_f}\, m\, \dot{\theta}\, \sin\left(\delta_{\mathrm{f}}\right)} -$$

$$\frac{\mathrm{C_{ry}}\, \mathrm{atan2}\left(\mathrm{v_y} - \mathrm{l_f}\, \dot{\theta}, \mathrm{v_x} + \dot{\theta}\, w\right)}{m} -$$

$$\frac{\mathrm{C_{ry}}\, \mathrm{atan2}\left(\mathrm{v_y} - \mathrm{l_f}\, \dot{\theta}, \mathrm{v_x} - \dot{\theta}\, w\right)}{m} -$$

$$\frac{2\, \mathrm{C_{fx}}\, \sin\left(\delta_{\mathrm{f}}\right)}{m} -$$

$$\frac{\mathrm{C_{fy}}\, \mathrm{atan2}\left(\mathrm{v_y}\, \cos\left(\delta_{\mathrm{f}}\right) - \mathrm{v_x}\, \sin\left(\delta_{\mathrm{f}}\right) + \mathrm{l_f}\, \dot{\theta}\, \cos\left(\delta_{\mathrm{f}}\right) - \dot{\theta}\, w\, \sin\left(\delta_{\mathrm{f}}\right), \mathrm{v_x}\, \cos\left(\delta_{\mathrm{f}}\right) + \mathrm{v_y}\, \sin\left(\delta_{\mathrm{f}}\right) + \dot{\theta}\, w\, \cos\left(\delta_{\mathrm{f}}\right) + \mathrm{l_f}\, \dot{\theta}\, \sin\left(\delta_{\mathrm{f}}\right)\right)\, \cos\left(\delta_{\mathrm{f}}\right)}{m} -$$

$$\frac{\mathrm{C_{fy}}\, \mathrm{atan2}\left(\mathrm{v_y}\, \cos\left(\delta_{\mathrm{f}}\right) - \mathrm{v_x}\, \sin\left(\delta_{\mathrm{f}}\right) + \mathrm{l_f}\, \dot{\theta}\, \cos\left(\delta_{\mathrm{f}}\right) + \dot{\theta}\, w\, \sin\left(\delta_{\mathrm{f}}\right), \mathrm{v_x}\, \cos\left(\delta_{\mathrm{f}}\right) + \mathrm{v_y}\, \sin\left(\delta_{\mathrm{f}}\right) - \dot{\theta}\, w\, \cos\left(\delta_{\mathrm{f}}\right) + \mathrm{l_f}\, \dot{\theta}\, \sin\left(\delta_{\mathrm{f}}\right)\right)\, \cos\left(\delta_{\mathrm{f}}\right)}{m} - \dot{\theta}\, \mathrm{v_x} +$$

$$\frac{\mathrm{C_{fx}}\, \mathrm{r_w}\, \omega_{\mathrm{fr}}\, \sin\left(\delta_{\mathrm{f}}\right)}{m\, \mathrm{v_x}\, \cos\left(\delta_{\mathrm{f}}\right) + m\, \mathrm{v_y}\, \sin\left(\delta_{\mathrm{f}}\right) + m\, \dot{\theta}\, w\, \cos\left(\delta_{\mathrm{f}}\right) + \mathrm{l_f}\, m\, \dot{\theta}\, \sin\left(\delta_{\mathrm{f}}\right)}$$

$$
\begin{aligned}
&\frac{\mathrm{C_{ry}\,l_r\,atan2}\left(\mathrm{v_y}-\mathrm{l_f}\,\dot{\theta},\mathrm{v_x}+\dot{\theta}\,w\right)}{\mathrm{J_z}}+\\
&\frac{\mathrm{C_{ry}\,l_r\,atan2}\left(\mathrm{v_y}-\mathrm{l_f}\,\dot{\theta},\mathrm{v_x}-\dot{\theta}\,w\right)}{\mathrm{J_z}}-\\
&\frac{2\,\mathrm{C_{fx}\,l_f}\,\sin\left(\delta_\mathrm{f}\right)}{\mathrm{J_z}}-\\
&\frac{\mathrm{C_{fy}\,l_f\,atan2}\left(\mathrm{v_y}\,\cos\left(\delta_\mathrm{f}\right)-\mathrm{v_x}\,\sin\left(\delta_\mathrm{f}\right)+\mathrm{l_f}\,\dot{\theta}\,\cos\left(\delta_\mathrm{f}\right)-\dot{\theta}\,w\,\sin\left(\delta_\mathrm{f}\right),\mathrm{v_x}\,\cos\left(\delta_\mathrm{f}\right)+\mathrm{v_y}\,\sin\left(\delta_\mathrm{f}\right)+\dot{\theta}\,w\,\cos\left(\delta_\mathrm{f}\right)+\mathrm{l_f}\,\dot{\theta}\,\sin\left(\delta_\mathrm{f}\right)\right)\cos\left(\delta_\mathrm{f}\right)}{\mathrm{J_z}}-\\
&\frac{\mathrm{C_{fy}\,l_f\,atan2}\left(\mathrm{v_y}\,\cos\left(\delta_\mathrm{f}\right)-\mathrm{v_x}\,\sin\left(\delta_\mathrm{f}\right)+\mathrm{l_f}\,\dot{\theta}\,\cos\left(\delta_\mathrm{f}\right)+\dot{\theta}\,w\,\sin\left(\delta_\mathrm{f}\right),\mathrm{v_x}\,\cos\left(\delta_\mathrm{f}\right)+\mathrm{v_y}\,\sin\left(\delta_\mathrm{f}\right)-\dot{\theta}\,w\,\cos\left(\delta_\mathrm{f}\right)+\mathrm{l_f}\,\dot{\theta}\,\sin\left(\delta_\mathrm{f}\right)\right)\cos\left(\delta_\mathrm{f}\right)}{\mathrm{J_z}}+\\
&\frac{\mathrm{C_{fy}}\,w\,\mathrm{atan2}\left(\mathrm{v_y}\,\cos\left(\delta_\mathrm{f}\right)-\mathrm{v_x}\,\sin\left(\delta_\mathrm{f}\right)+\mathrm{l_f}\,\dot{\theta}\,\cos\left(\delta_\mathrm{f}\right)-\dot{\theta}\,w\,\sin\left(\delta_\mathrm{f}\right),\mathrm{v_x}\,\cos\left(\delta_\mathrm{f}\right)+\mathrm{v_y}\,\sin\left(\delta_\mathrm{f}\right)+\dot{\theta}\,w\,\cos\left(\delta_\mathrm{f}\right)+\mathrm{l_f}\,\dot{\theta}\,\sin\left(\delta_\mathrm{f}\right)\right)\sin\left(\delta_\mathrm{f}\right)}{\mathrm{J_z}}-\\
&\frac{\mathrm{C_{fy}}\,w\,\mathrm{atan2}\left(\mathrm{v_y}\,\cos\left(\delta_\mathrm{f}\right)-\mathrm{v_x}\,\sin\left(\delta_\mathrm{f}\right)+\mathrm{l_f}\,\dot{\theta}\,\cos\left(\delta_\mathrm{f}\right)+\dot{\theta}\,w\,\sin\left(\delta_\mathrm{f}\right),\mathrm{v_x}\,\cos\left(\delta_\mathrm{f}\right)+\mathrm{v_y}\,\sin\left(\delta_\mathrm{f}\right)-\dot{\theta}\,w\,\cos\left(\delta_\mathrm{f}\right)+\mathrm{l_f}\,\dot{\theta}\,\sin\left(\delta_\mathrm{f}\right)\right)\sin\left(\delta_\mathrm{f}\right)}{\mathrm{J_z}}-\\
&\frac{\mathrm{C_{rx}\,r_w}\,w\,\omega_\mathrm{rl}}{\mathrm{J_z\,v_x}-\mathrm{J_z}\,\dot{\theta}\,w}+\\
&\frac{\mathrm{C_{rx}\,r_w}\,w\,\omega_\mathrm{rr}}{\mathrm{J_z\,v_x}+\mathrm{J_z}\,\dot{\theta}\,w}-\\
&\frac{\mathrm{C_{fx}\,r_w}\,w\,\omega_\mathrm{fl}\,\cos\left(\delta_\mathrm{f}\right)}{\mathrm{J_z\,v_x}\,\cos\left(\delta_\mathrm{f}\right)+\mathrm{J_z\,v_y}\,\sin\left(\delta_\mathrm{f}\right)-\mathrm{J_z}\,\dot{\theta}\,w\,\cos\left(\delta_\mathrm{f}\right)+\mathrm{J_z\,l_f}\,\dot{\theta}\,\sin\left(\delta_\mathrm{f}\right)}+\\
&\frac{\mathrm{C_{fx}\,r_w}\,w\,\omega_\mathrm{fr}\,\cos\left(\delta_\mathrm{f}\right)}{\mathrm{J_z\,v_x}\,\cos\left(\delta_\mathrm{f}\right)+\mathrm{J_z\,v_y}\,\sin\left(\delta_\mathrm{f}\right)+\mathrm{J_z}\,\dot{\theta}\,w\,\cos\left(\delta_\mathrm{f}\right)+\mathrm{J_z\,l_f}\,\dot{\theta}\,\sin\left(\delta_\mathrm{f}\right)}+\\
&\frac{\mathrm{C_{fx}\,l_f\,r_w}\,\omega_\mathrm{fl}\,\sin\left(\delta_\mathrm{f}\right)}{\mathrm{J_z\,v_x}\,\cos\left(\delta_\mathrm{f}\right)+\mathrm{J_z\,v_y}\,\sin\left(\delta_\mathrm{f}\right)-\mathrm{J_z}\,\dot{\theta}\,w\,\cos\left(\delta_\mathrm{f}\right)+\mathrm{J_z\,l_f}\,\dot{\theta}\,\sin\left(\delta_\mathrm{f}\right)}+\\
&\frac{\mathrm{C_{fx}\,l_f\,r_w}\,\omega_\mathrm{fr}\,\sin\left(\delta_\mathrm{f}\right)}{\mathrm{J_z\,v_x}\,\cos\left(\delta_\mathrm{f}\right)+\mathrm{J_z\,v_y}\,\sin\left(\delta_\mathrm{f}\right)+\mathrm{J_z}\,\dot{\theta}\,w\,\cos\left(\delta_\mathrm{f}\right)+\mathrm{J_z\,l_f}\,\dot{\theta}\,\sin\left(\delta_\mathrm{f}\right)}
\end{aligned}
$$

$$\frac{\frac{T_{fl}}{J_w} + \frac{C_{fx}\, r_w}{J_w} - \frac{C_{fx}\, {r_w}^2\, \omega_{fl}}{J_w\, v_x\, \cos(\delta_f) + J_w\, v_y\, \sin(\delta_f) - J_w\, \dot{\theta}\, w\, \cos(\delta_f) + J_w\, l_f\, \dot{\theta}\, \sin(\delta_f)}}{}$$