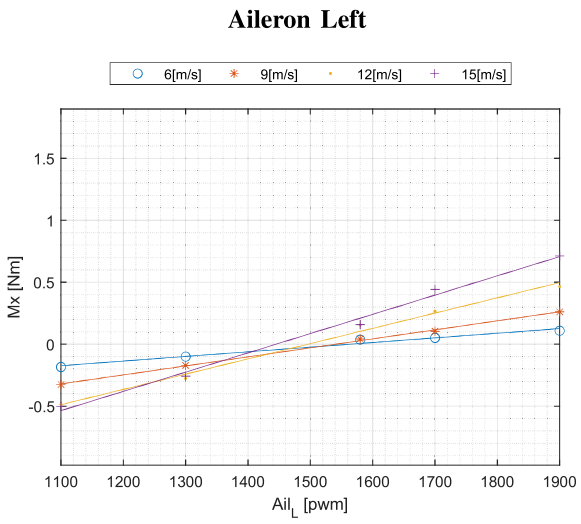

Fig. 9. Linear relation between exerted roll moment and command to the left aileron at different windspeeds

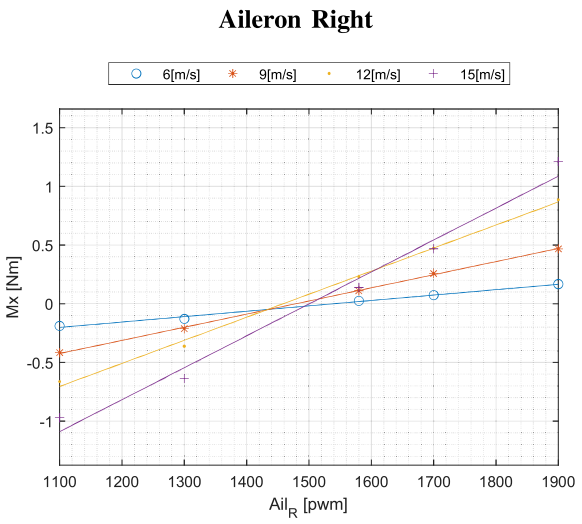

Fig. 10. Linear relation between exerted roll moment and command to the right aileron at different windspeeds

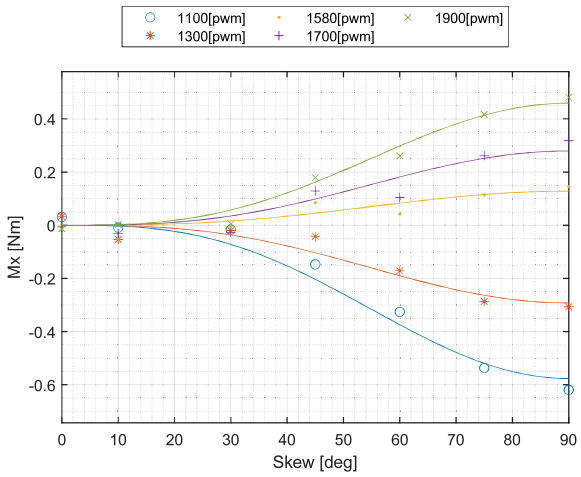

Fig. 11. Trigonometric relation between skew and roll moment exerted by the left aileron at different pwm command values

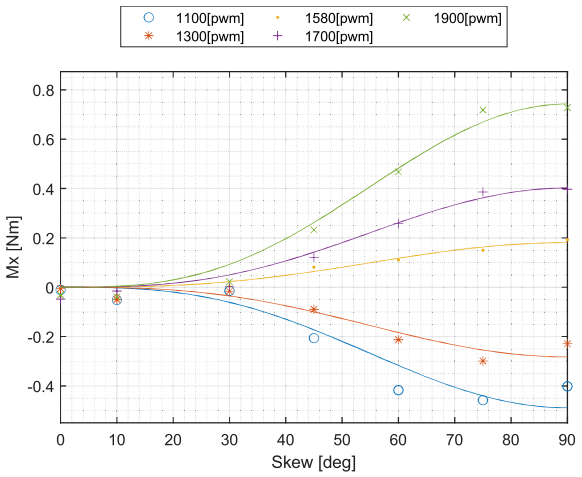

Fig. 12. Trigonometric relation between skew and roll moment exerted by the right aileron at different pwm command values

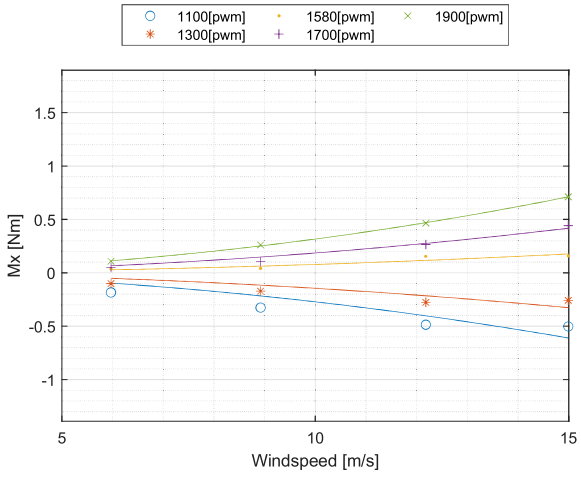

Fig. 13. Quadratic relation between windspeed and roll moment exerted by the left aileron at different pwm command values

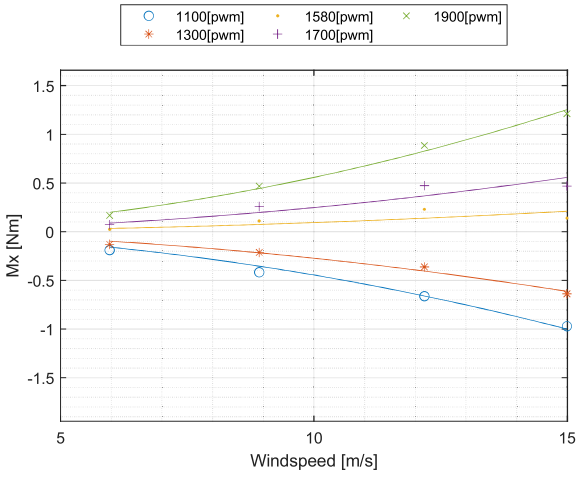

Fig. 14. Quadratic relation between windspeed and roll moment exerted by the right aileron at different pwm command values

Aileron Left

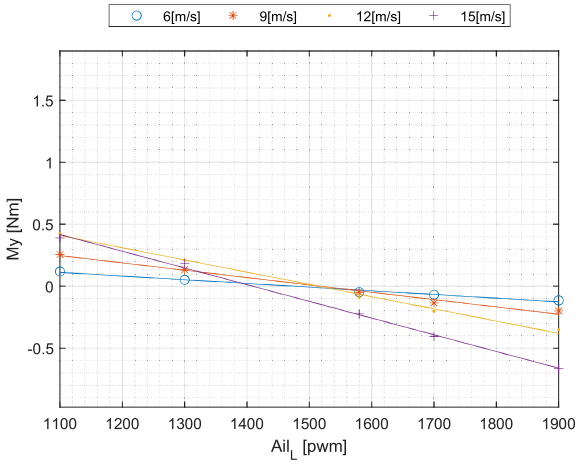

Fig. 15. Linear relation between exerted pitch moment and command to the left aileron at different windspeeds

Aileron Right

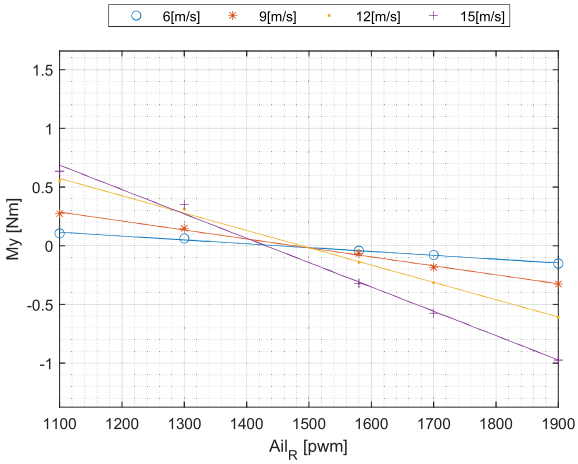

Fig. 16. Linear relation between exerted pitch moment and command to the right aileron at different windspeeds

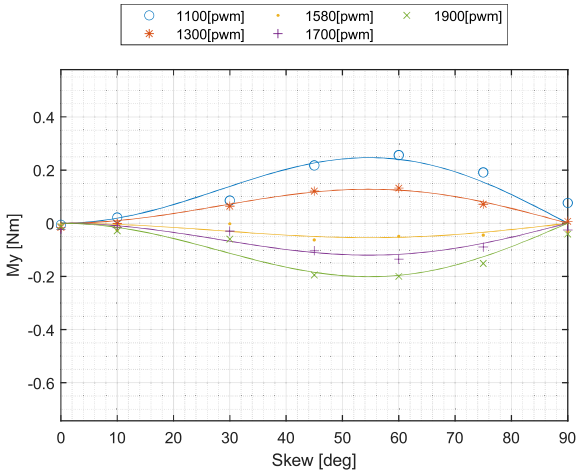

Fig. 17. Trigonometric relation between skew and pitch moment exerted by the left aileron at different pwm command values

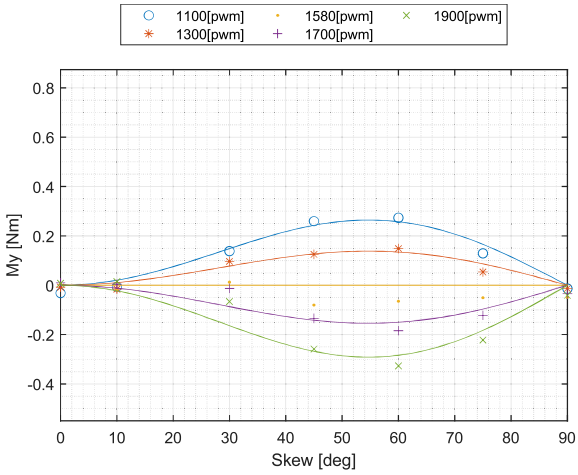

Fig. 18. Trigonometric relation between skew and pitch moment exerted by the right aileron at different pwm command values

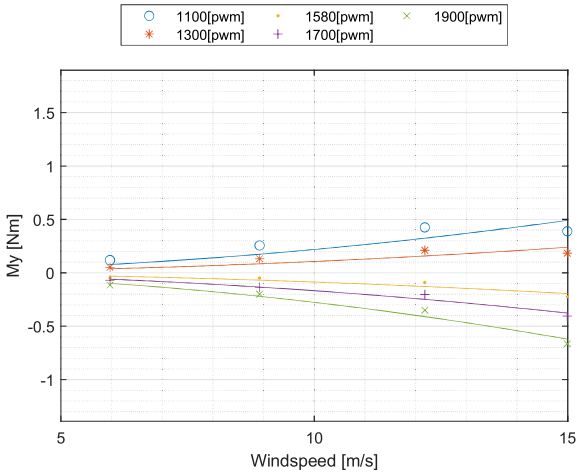

Fig. 19. Quadratic relation between windspeed and pitch moment exerted by the left aileron at different pwm command values

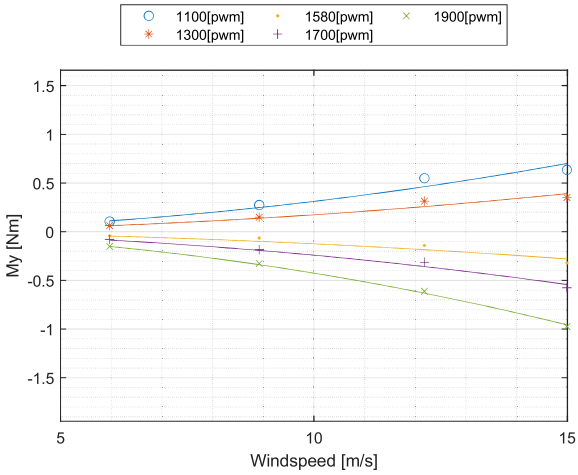

Fig. 20. Quadratic relation between windspeed and pitch moment exerted by the right aileron at different pwm command values

Elevator

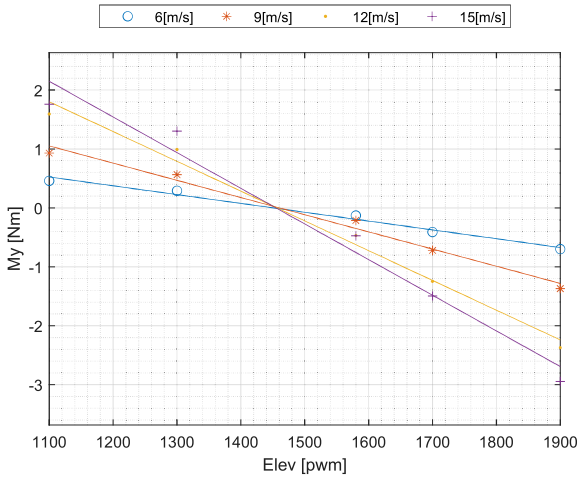

Fig. 21. Linear relation between exerted pitch moment and command to the elevator at different windspeeds

Rudder

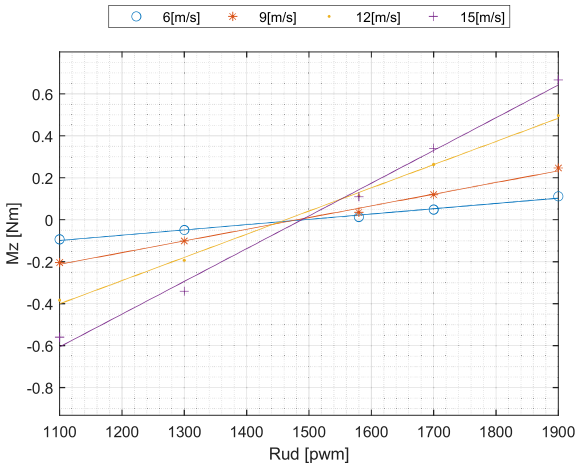

Fig. 22. Linear relation between exerted yaw moment and command to the rudder at different windspeeds

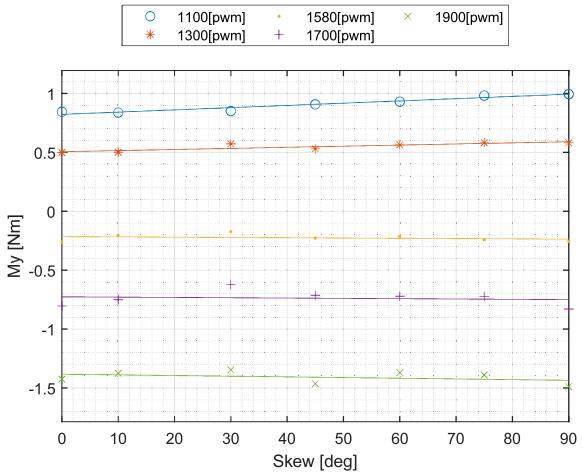

Fig. 23. Trigonometric relation between skew and pitch moment exerted by the elevator at different pwm command values

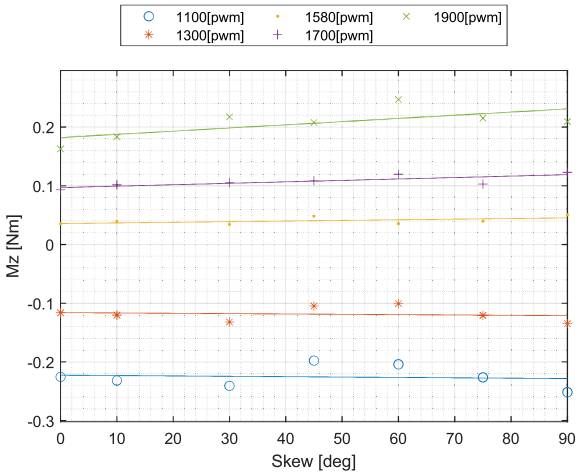

Fig. 24. Trigonometric relation between skew and yaw moment exerted by the rudder at different pwm command values

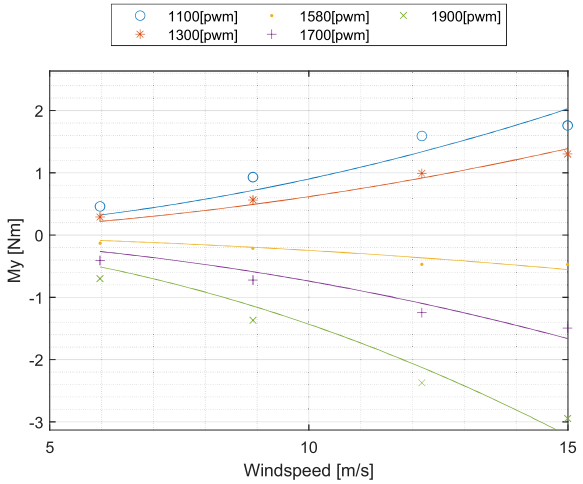

Fig. 25. Quadratic relation between windspeed and pitch moment exerted by the elevator at different pwm command values

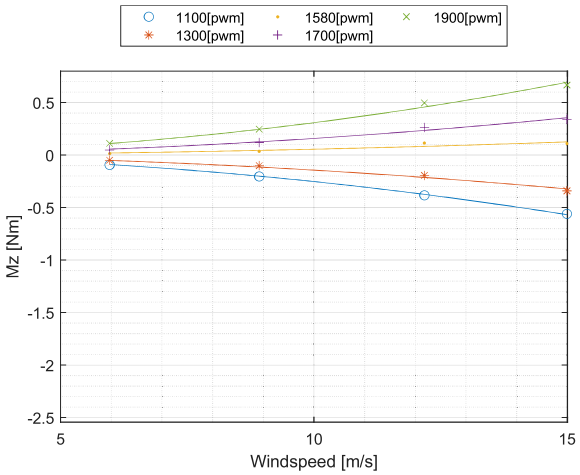

Fig. 26. Quadratic relation between windspeed and yaw moment exerted by the rudder at different pwm command values

Algorithm 1: Maximum Roll Moment Optimization

Optimization variables:

$$\boldsymbol{\omega} = \begin{bmatrix} \omega_0 \ \omega_1 \ \omega_2 \ \omega_3 \end{bmatrix}^T$$

$$\boldsymbol{\delta} = \begin{bmatrix} \delta_{\text{al}} \ \delta_{\text{ar}} \ \delta_{\text{el}} \ \delta_{\text{ru}} \end{bmatrix}^T$$

Cost function:

$$\max_{\boldsymbol{\omega},\boldsymbol{\delta}} \ C(\boldsymbol{\omega},\boldsymbol{\delta}) = M_{c_{mot}}(1,:)\boldsymbol{\omega} + M_{c_{as}}(1,:)\boldsymbol{\delta}$$

Constraints:

$$\omega_{min} \leq \boldsymbol{\omega} \leq \omega_{max}$$

$$\delta_{min} \leq \boldsymbol{\delta} \leq \delta_{max}$$

$$M_{c_{mot}}(2,:)\boldsymbol{\omega} + M_{c_{as}}(2,:)\boldsymbol{\delta} = 0$$

$$M_{c_{mot}}(3,:)\boldsymbol{\omega} + M_{c_{as}}(3,:)\boldsymbol{\delta} = 0$$

$$\sum_{i=0}^{3} T_i\left(\omega_i\right) + L\left(\theta, \Lambda, v\right) \geq m \ g$$