

Kinematics Report

Simulation Author: Robert Horvath

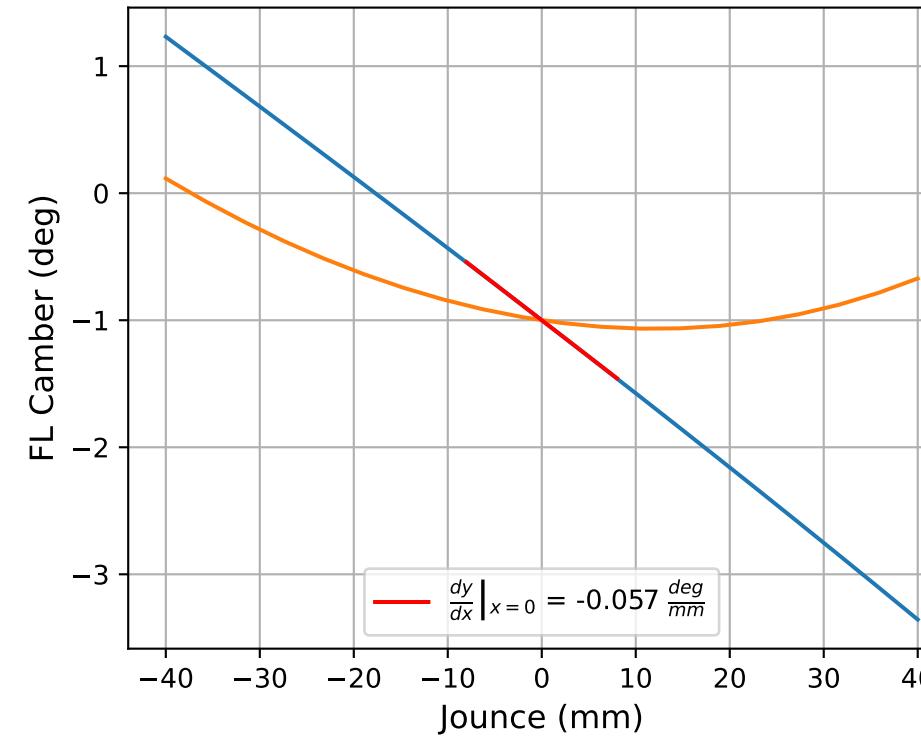
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Date: 2025-08-22, 07:40 AM UTC

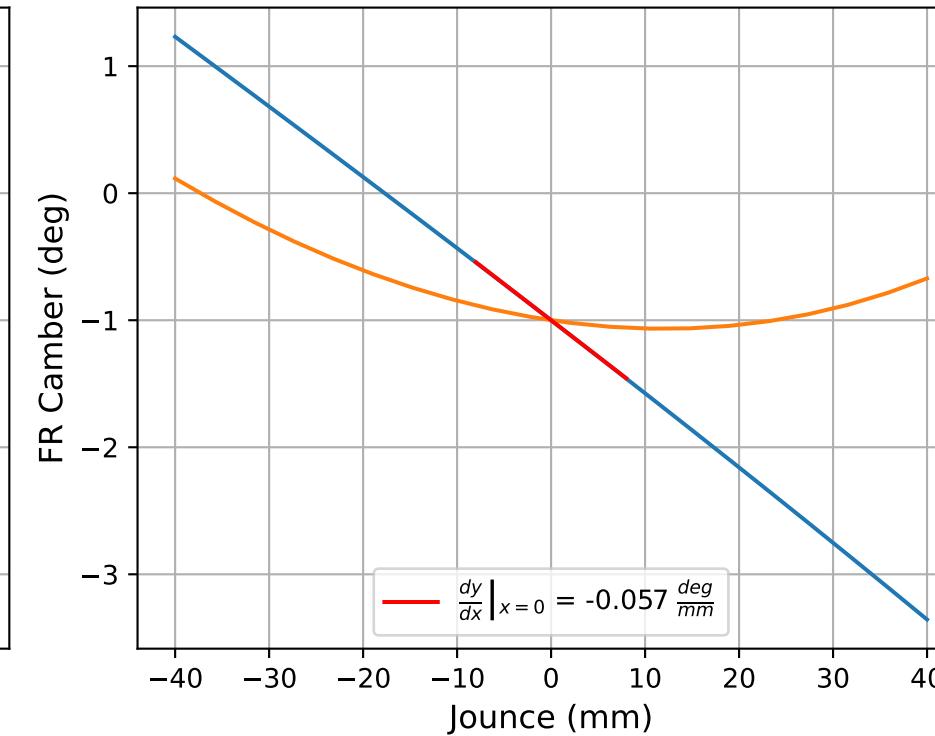
Note 1: Linear fits are tangent lines about $x = 0$ (NOT fits over the entire range)

Note 2: Cubic fits are performed over the entire visible domain (fits over the entire range)

FL Bump Camber



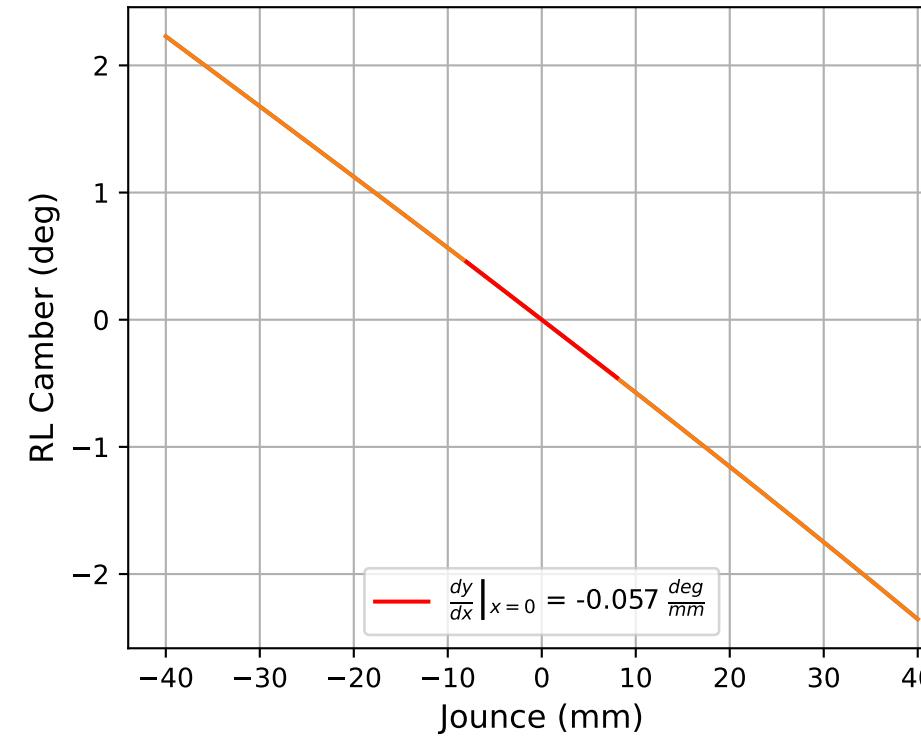
FR Bump Camber

**Linear Fit**

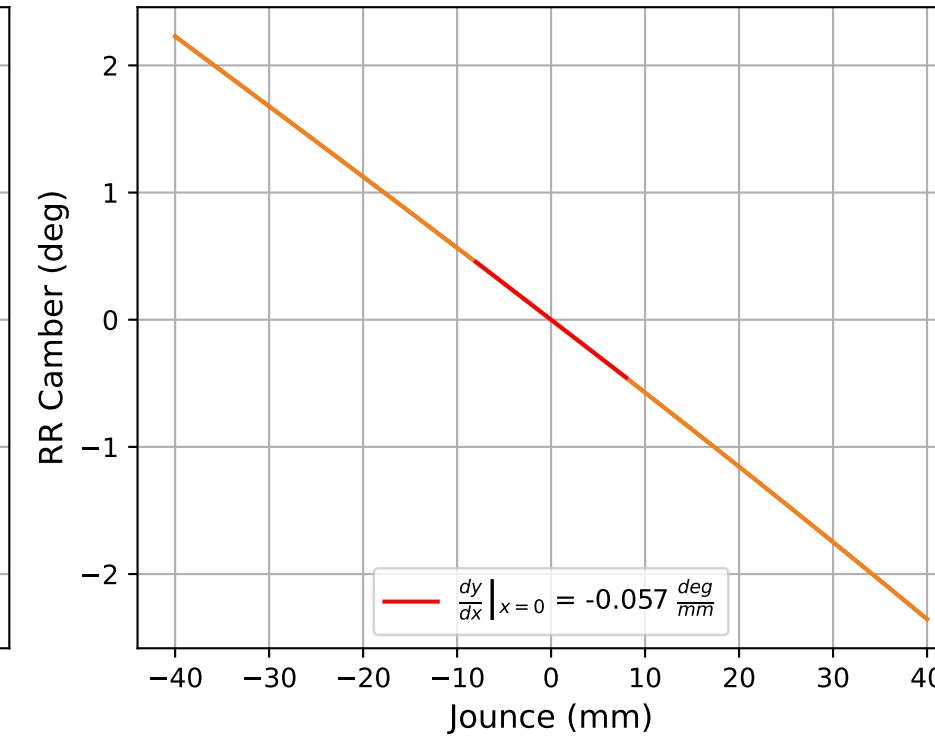
$$f(x) = a_1x + a_0$$

FL	$f(x) = -0.057x + 1.0$
FR	$f(x) = -0.057x + -1.0$
RL	$f(x) = -0.057x + 0.0$
RR	$f(x) = -0.057x + 0.0$

RL Bump Camber

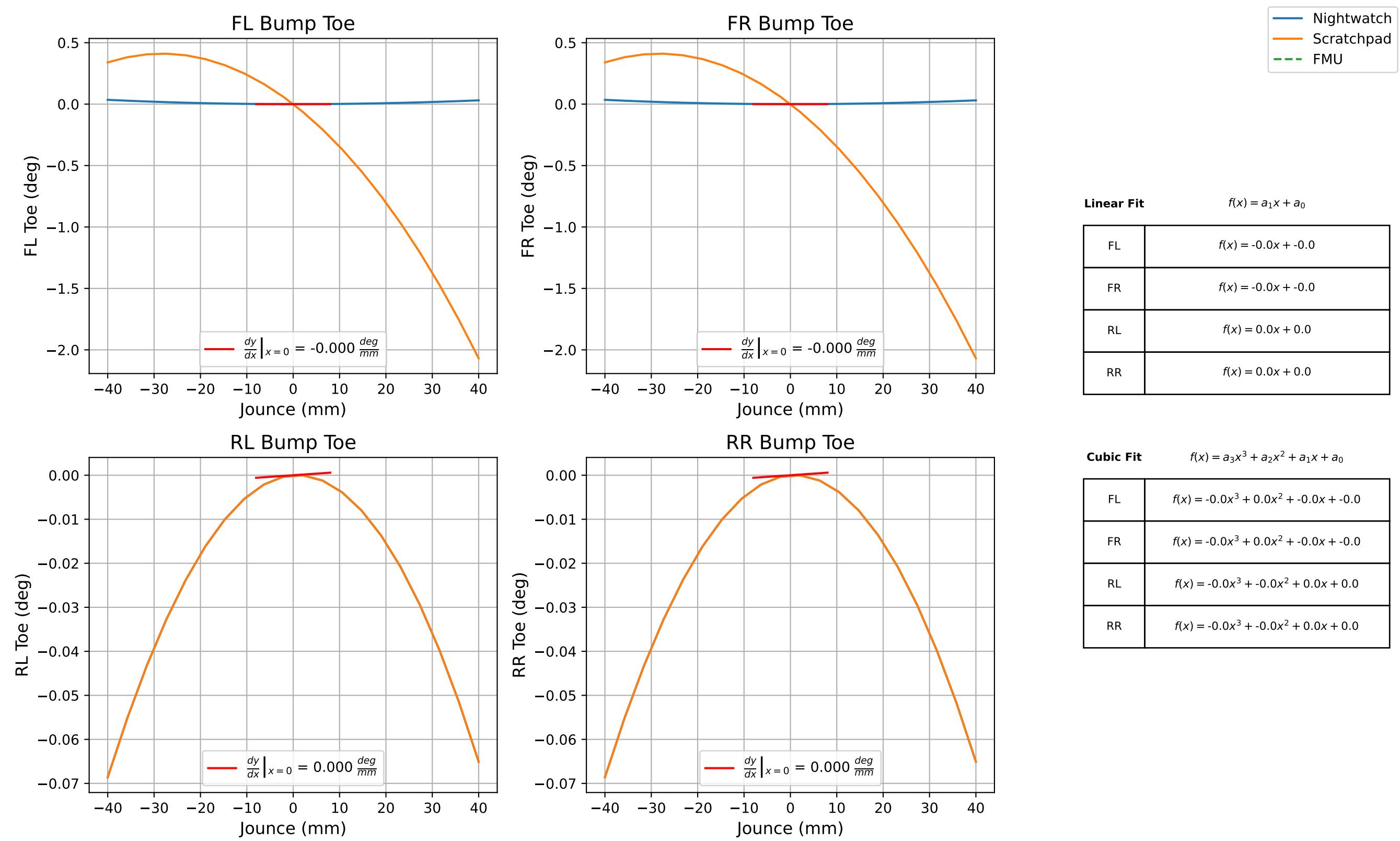


RR Bump Camber

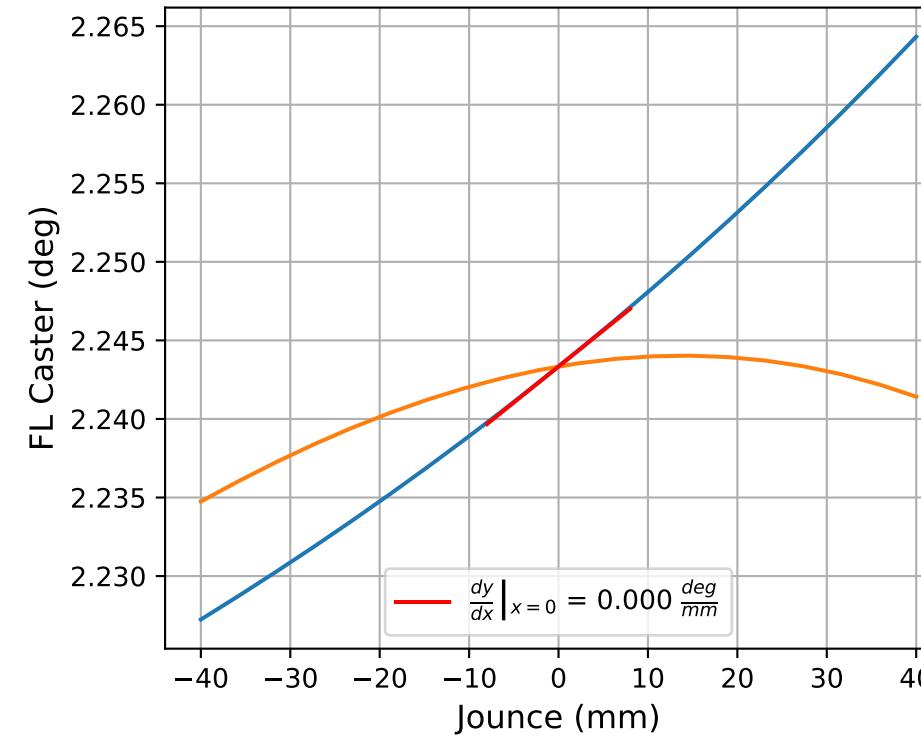
**Cubic Fit**

$$f(x) = a_3x^3 + a_2x^2 + a_1x + a_0$$

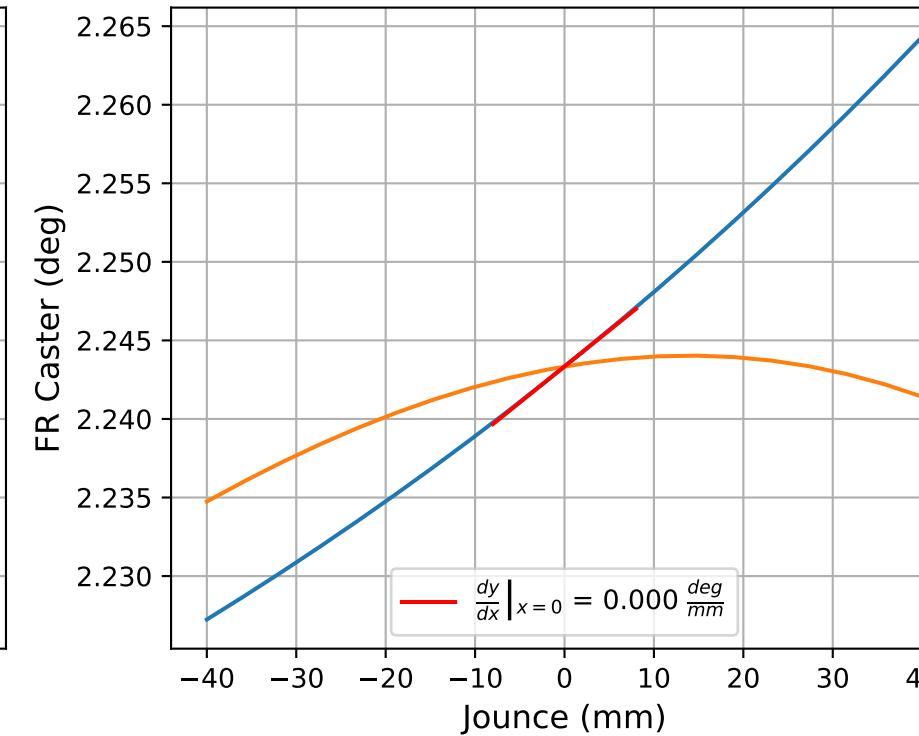
FL	$f(x) = -0.0x^3 + -0.0x^2 + -0.057x + -1.0$
FR	$f(x) = -0.0x^3 + -0.0x^2 + -0.057x + -1.0$
RL	$f(x) = -0.0x^3 + -0.0x^2 + -0.057x + 0.0$
RR	$f(x) = -0.0x^3 + -0.0x^2 + -0.057x + 0.0$



FL Bump Caster



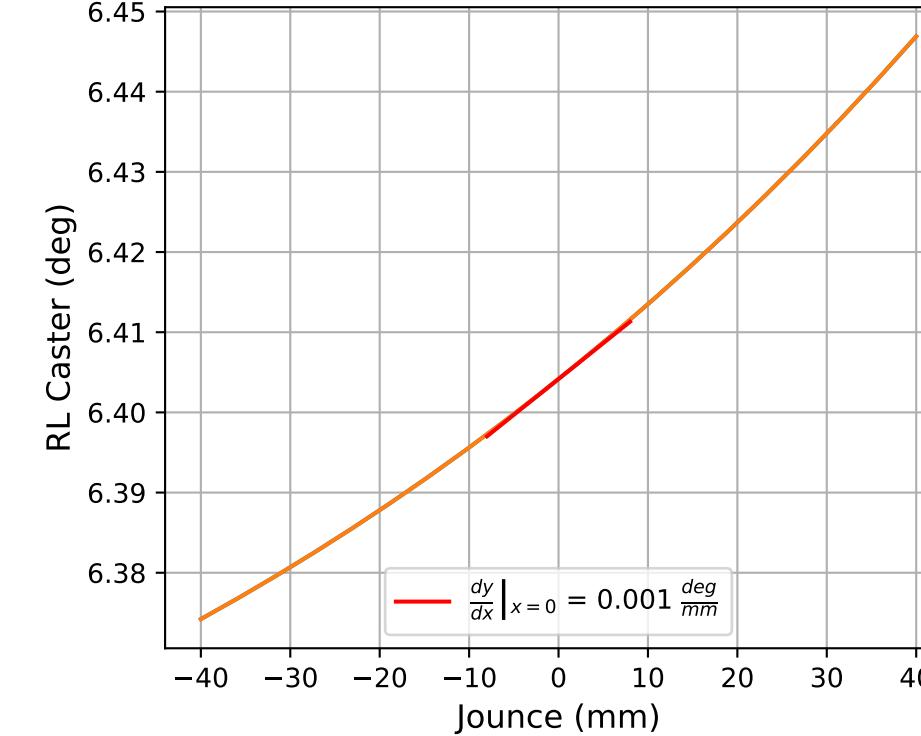
FR Bump Caster

**Linear Fit**

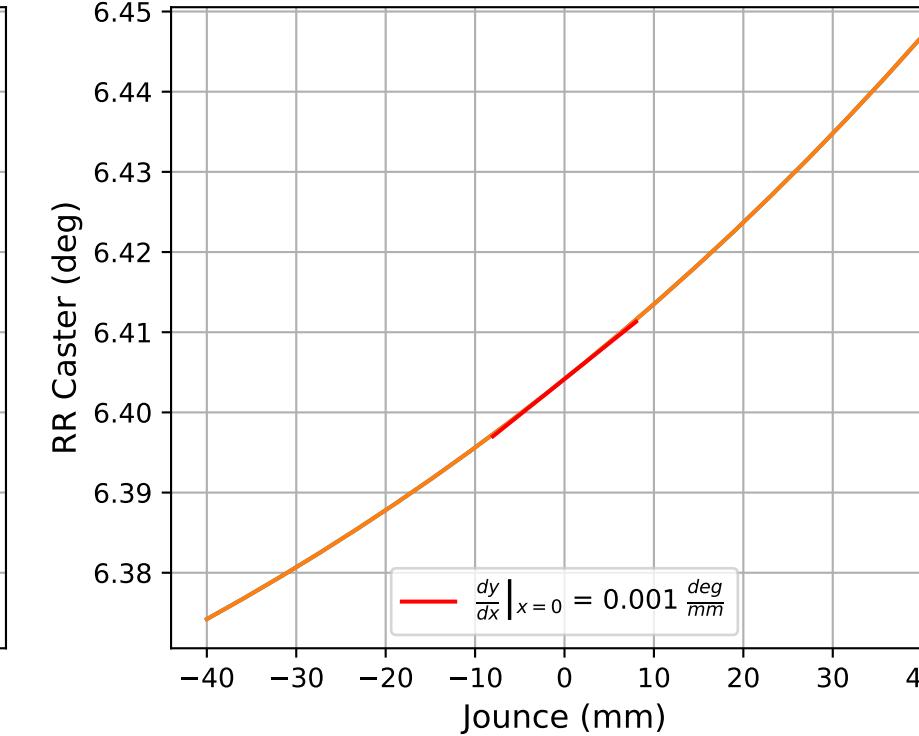
$$f(x) = a_1x + a_0$$

FL	$f(x) = 0.0x + 2.243$
FR	$f(x) = 0.0x + 2.243$
RL	$f(x) = 0.001x + 6.404$
RR	$f(x) = 0.001x + 6.404$

RL Bump Caster



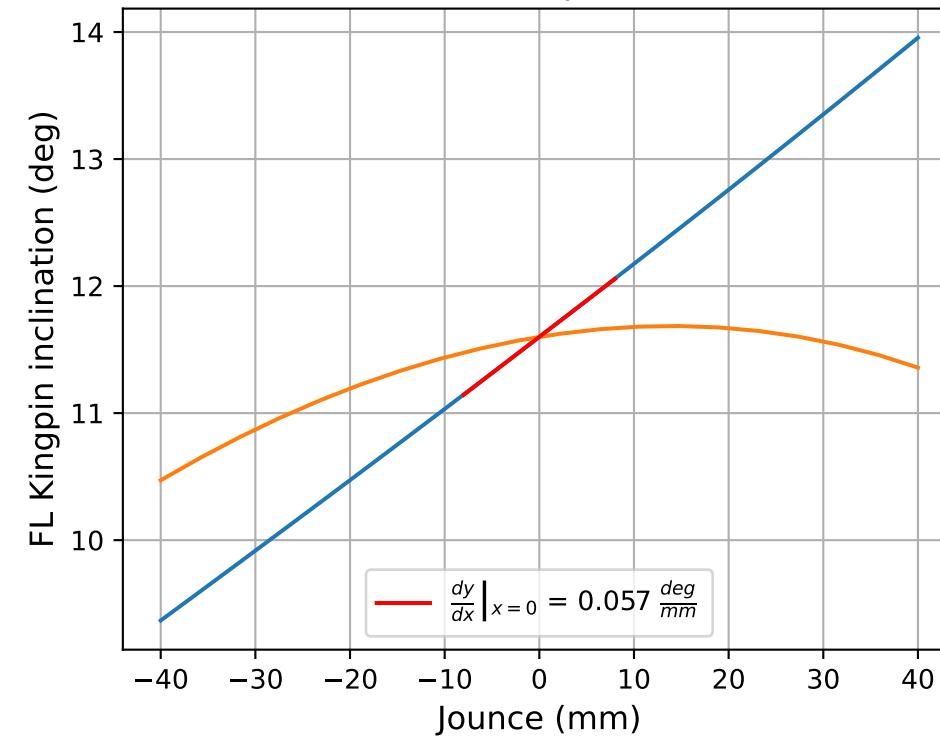
RR Bump Caster

**Cubic Fit**

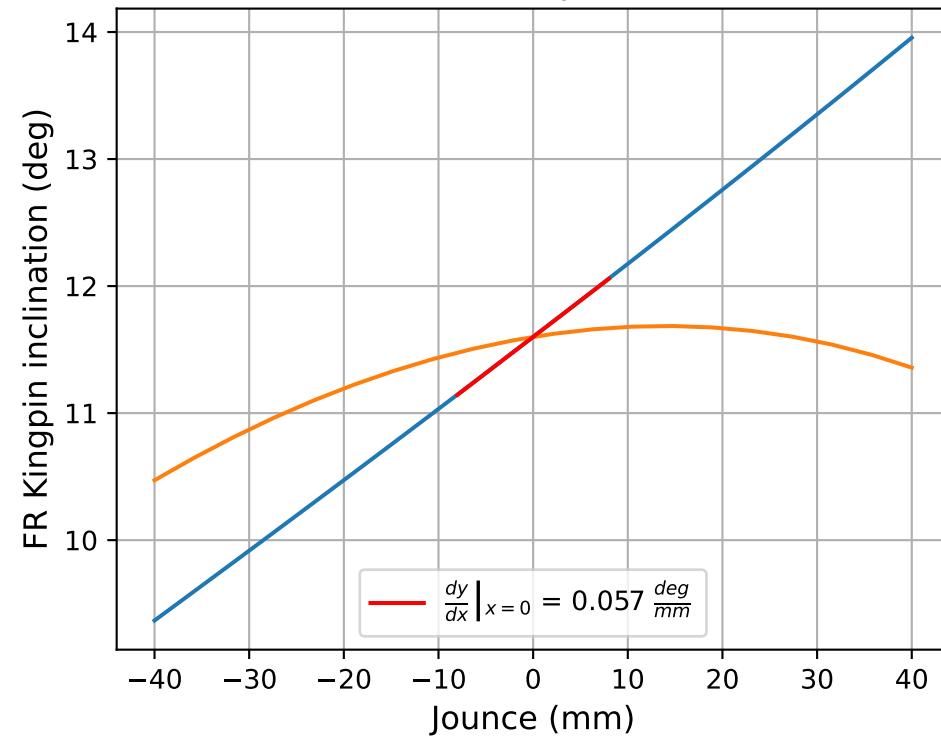
$$f(x) = a_3x^3 + a_2x^2 + a_1x + a_0$$

FL	$f(x) = 0.0x^3 + 0.0x^2 + 0.0x + 2.243$
FR	$f(x) = 0.0x^3 + 0.0x^2 + 0.0x + 2.243$
RL	$f(x) = 0.0x^3 + 0.0x^2 + 0.001x + 6.404$
RR	$f(x) = 0.0x^3 + 0.0x^2 + 0.001x + 6.404$

FL Bump KPI



FR Bump KPI

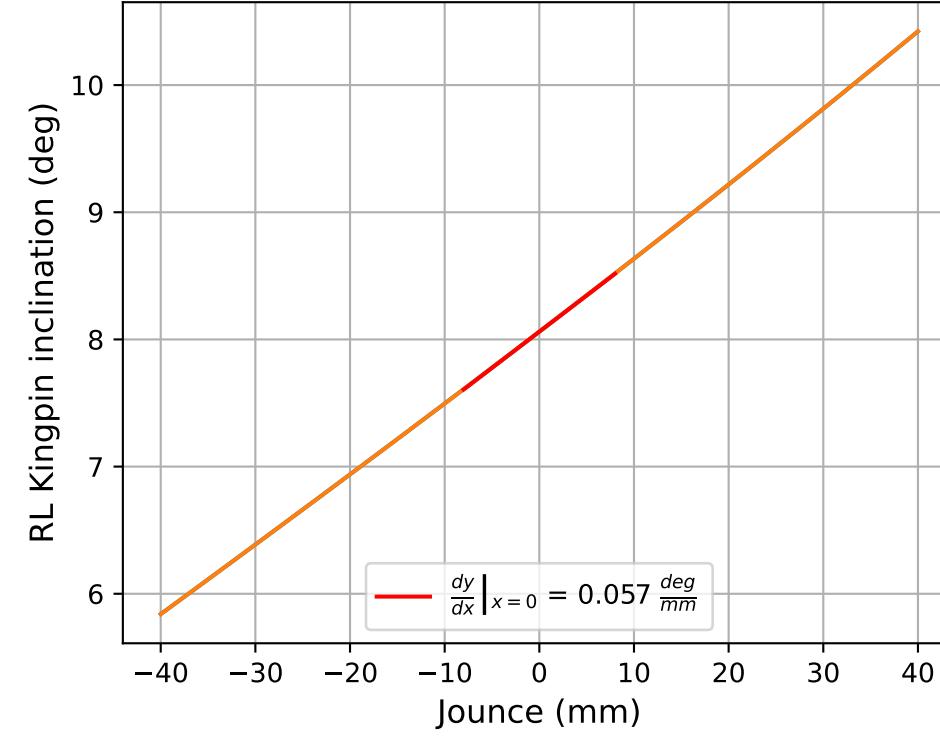


Linear Fit

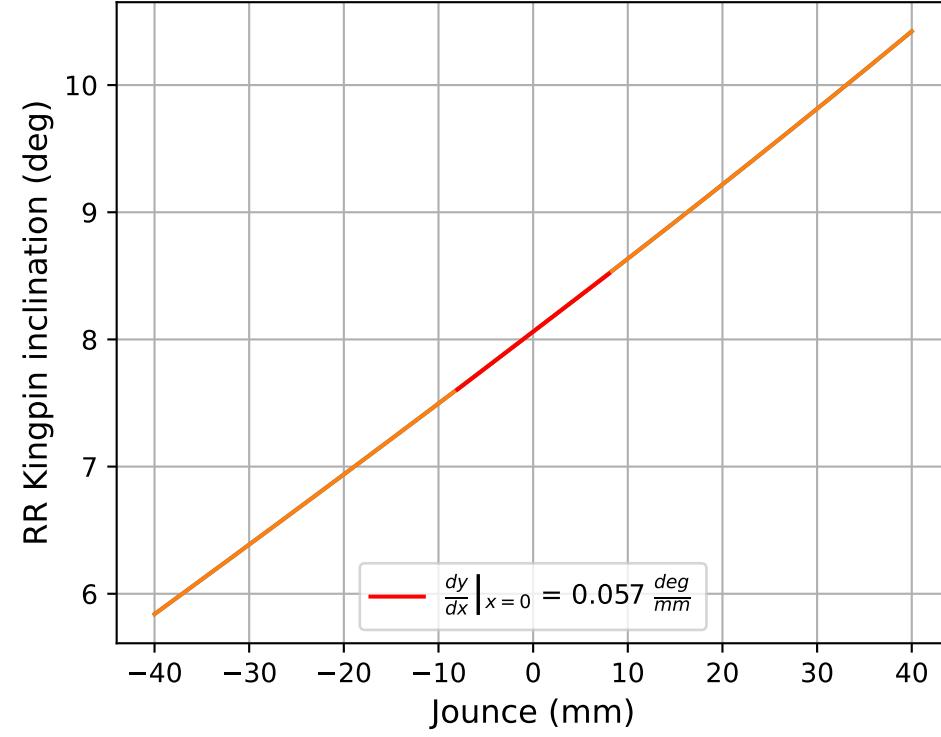
$$f(x) = a_1 x + a_0$$

FL	$f(x) = 0.057x + 11.6$
FR	$f(x) = 0.057x + 11.6$
RL	$f(x) = 0.057x + 8.061$
RR	$f(x) = 0.057x + 8.061$

RL Bump KPI



RR Bump KPI

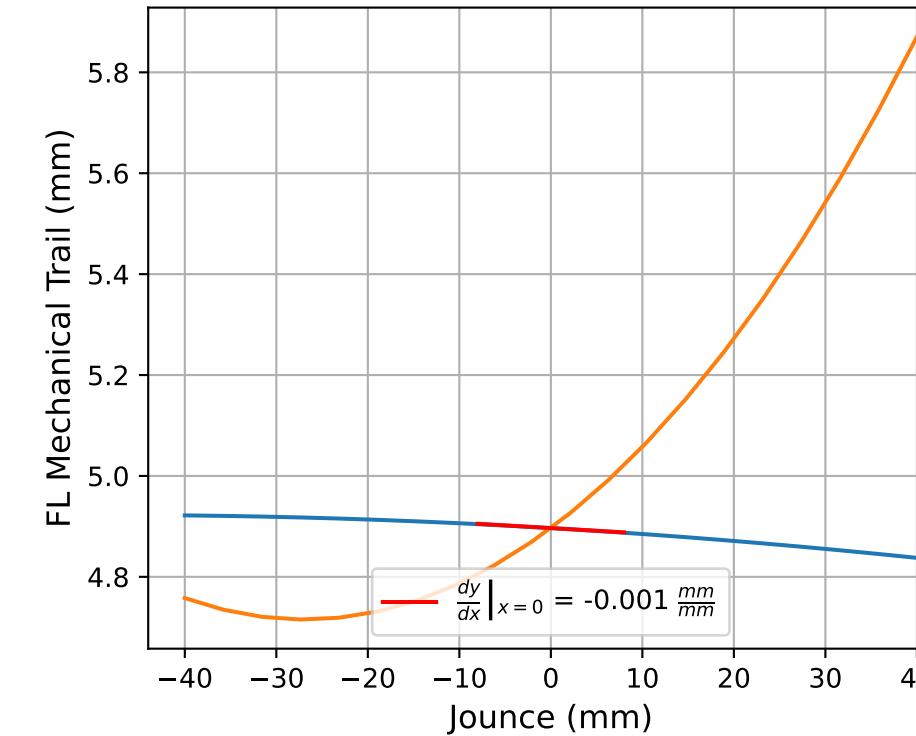


Cubic Fit

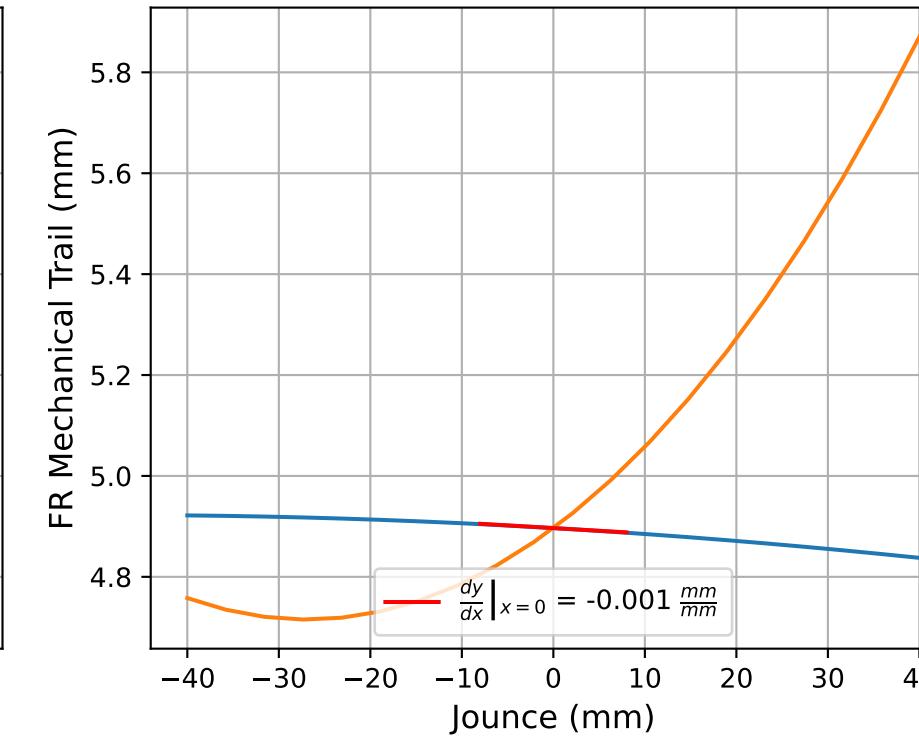
$$f(x) = a_3 x^3 + a_2 x^2 + a_1 x + a_0$$

FL	$f(x) = 0.0x^3 + 0.0x^2 + 0.057x + 11.6$
FR	$f(x) = 0.0x^3 + 0.0x^2 + 0.057x + 11.6$
RL	$f(x) = 0.0x^3 + 0.0x^2 + 0.057x + 8.061$
RR	$f(x) = 0.0x^3 + 0.0x^2 + 0.057x + 8.061$

FL Bump Mechanical Trail



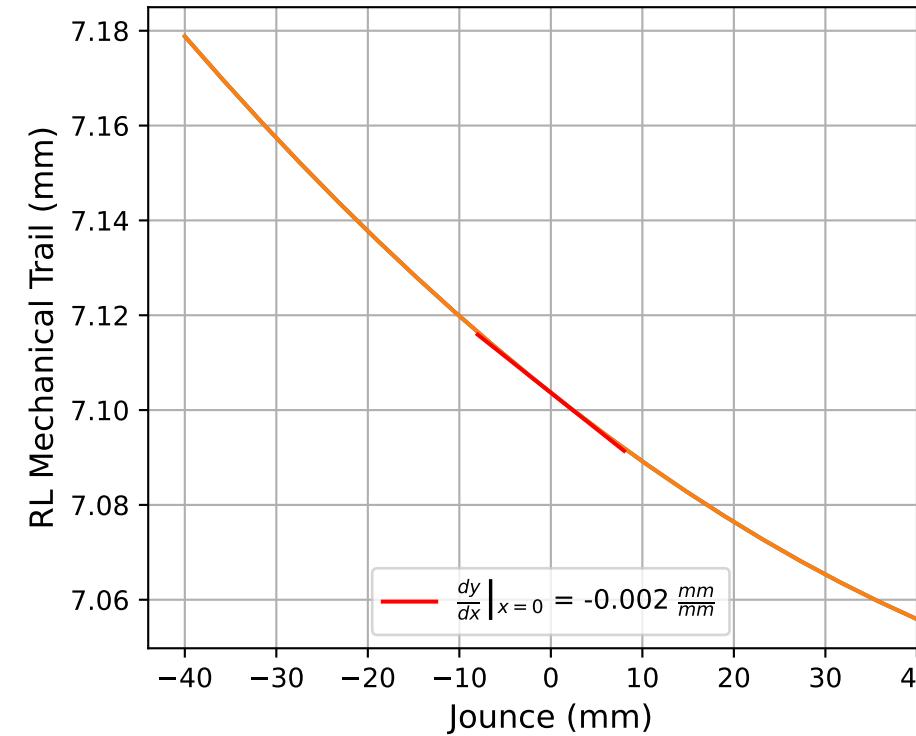
FR Bump Mechanical Trail

**Linear Fit**

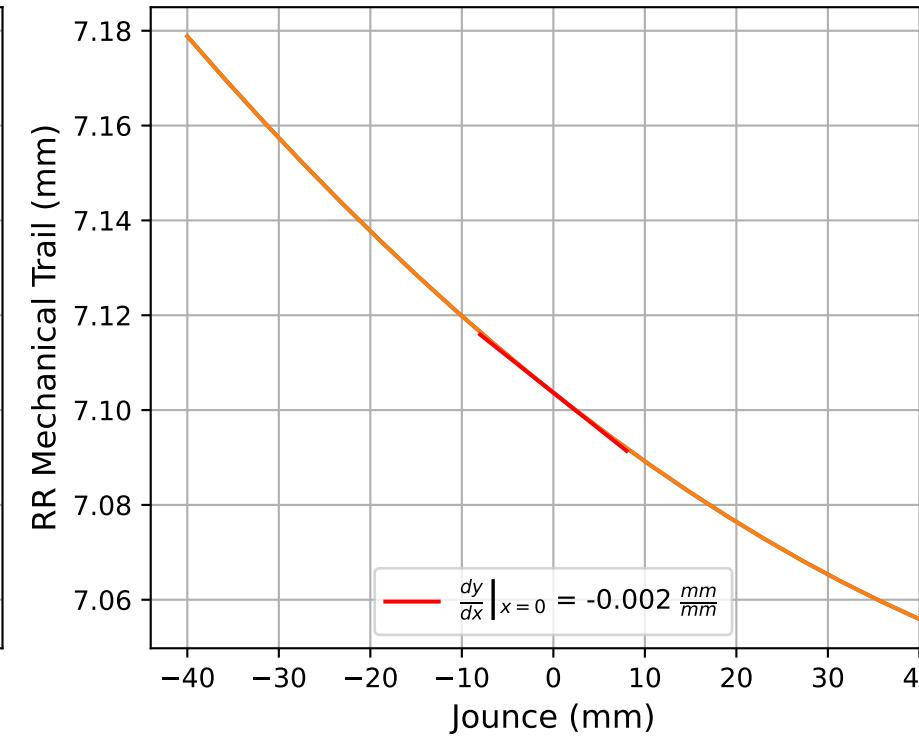
$$f(x) = a_1 x + a_0$$

FL	$f(x) = -0.001x + 4.897$
FR	$f(x) = -0.001x + 4.897$
RL	$f(x) = -0.002x + 7.104$
RR	$f(x) = -0.002x + 7.104$

RL Bump Mechanical Trail



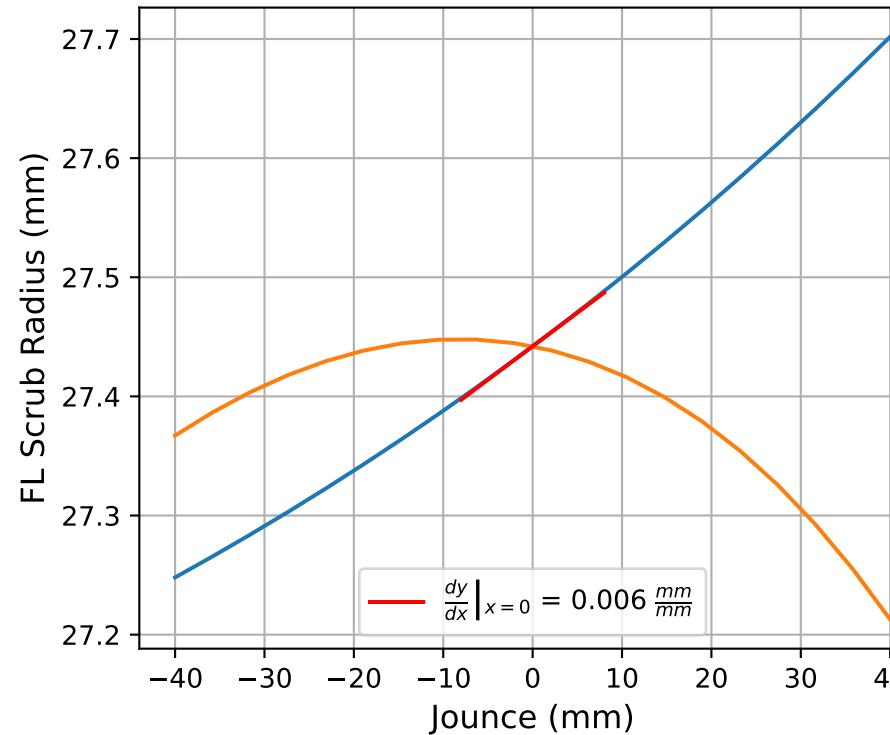
RR Bump Mechanical Trail

**Cubic Fit**

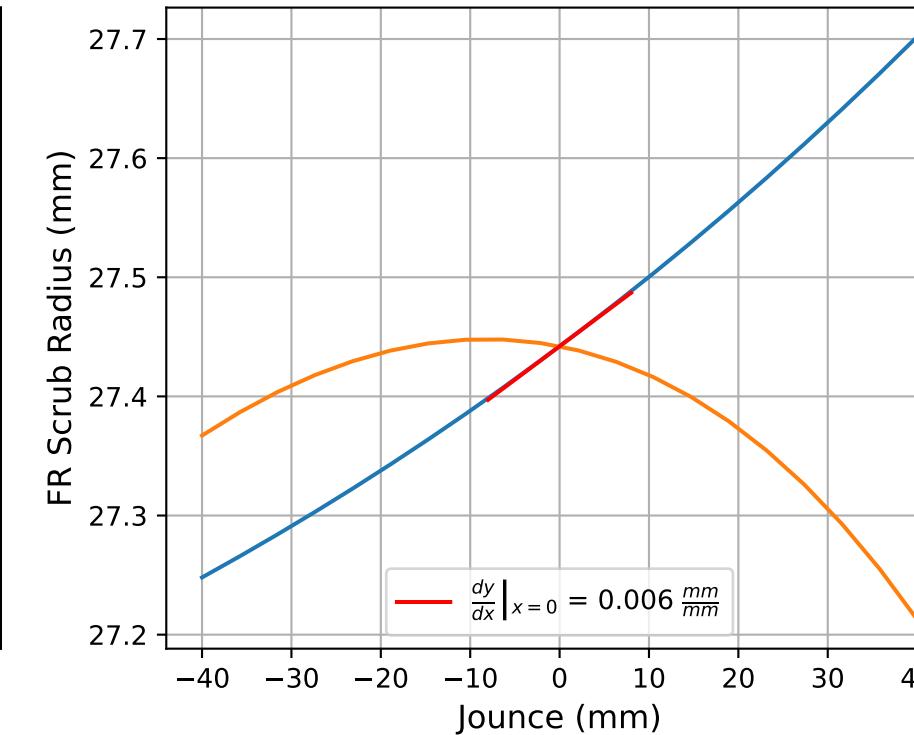
$$f(x) = a_3 x^3 + a_2 x^2 + a_1 x + a_0$$

FL	$f(x) = 0.0x^3 + -0.0x^2 + -0.001x + 4.897$
FR	$f(x) = 0.0x^3 + -0.0x^2 + -0.001x + 4.897$
RL	$f(x) = -0.0x^3 + 0.0x^2 + -0.002x + 7.104$
RR	$f(x) = -0.0x^3 + 0.0x^2 + -0.002x + 7.104$

FL Bump Scrub Radius



FR Bump Scrub Radius

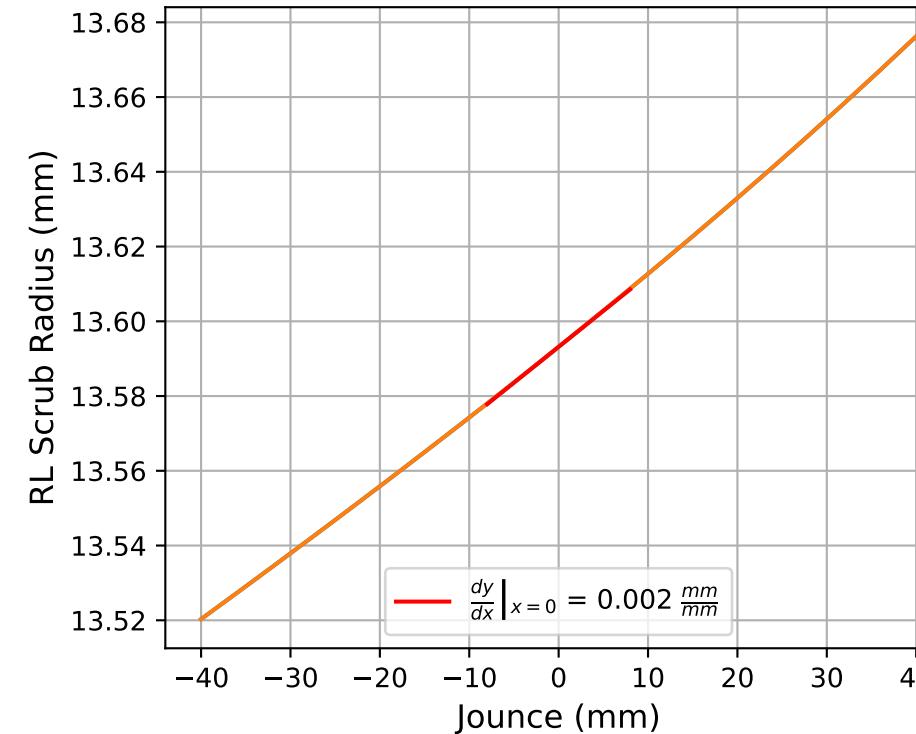


Linear Fit

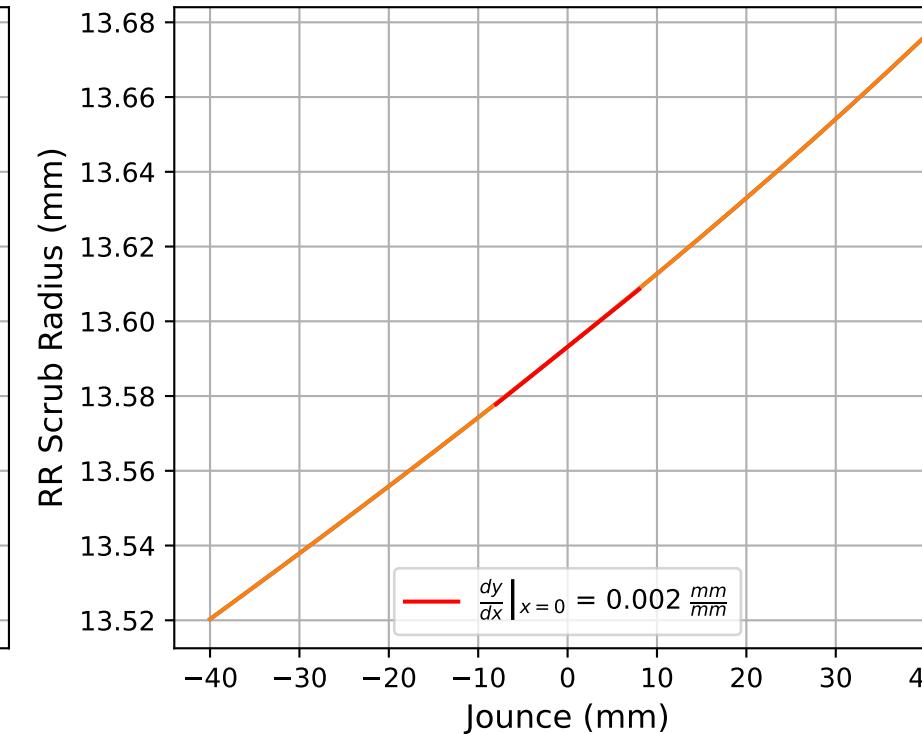
$$f(x) = a_1x + a_0$$

FL	$f(x) = 0.006x + 27.442$
FR	$f(x) = 0.006x + 27.442$
RL	$f(x) = 0.002x + 13.593$
RR	$f(x) = 0.002x + 13.593$

RL Bump Scrub Radius



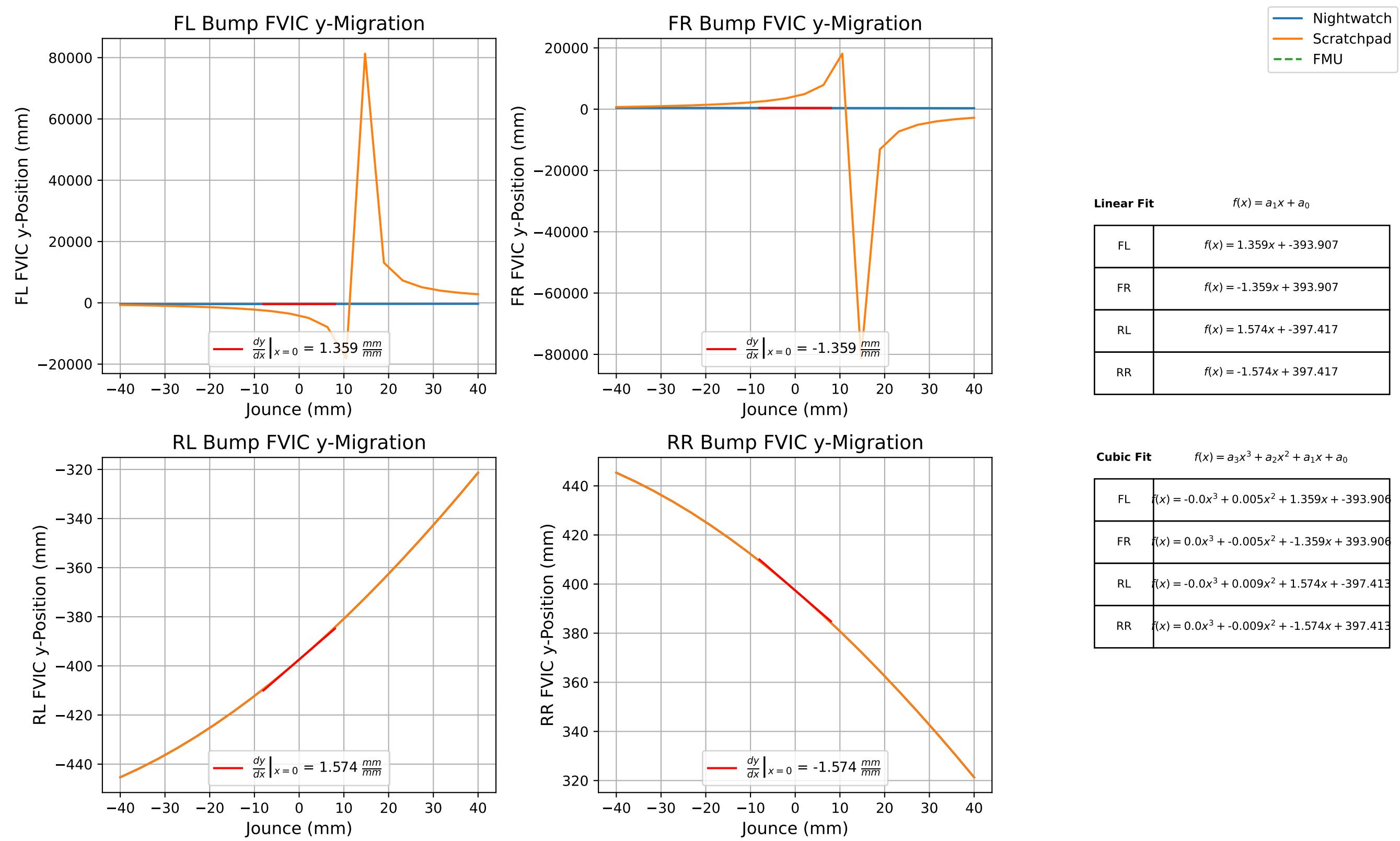
RR Bump Scrub Radius

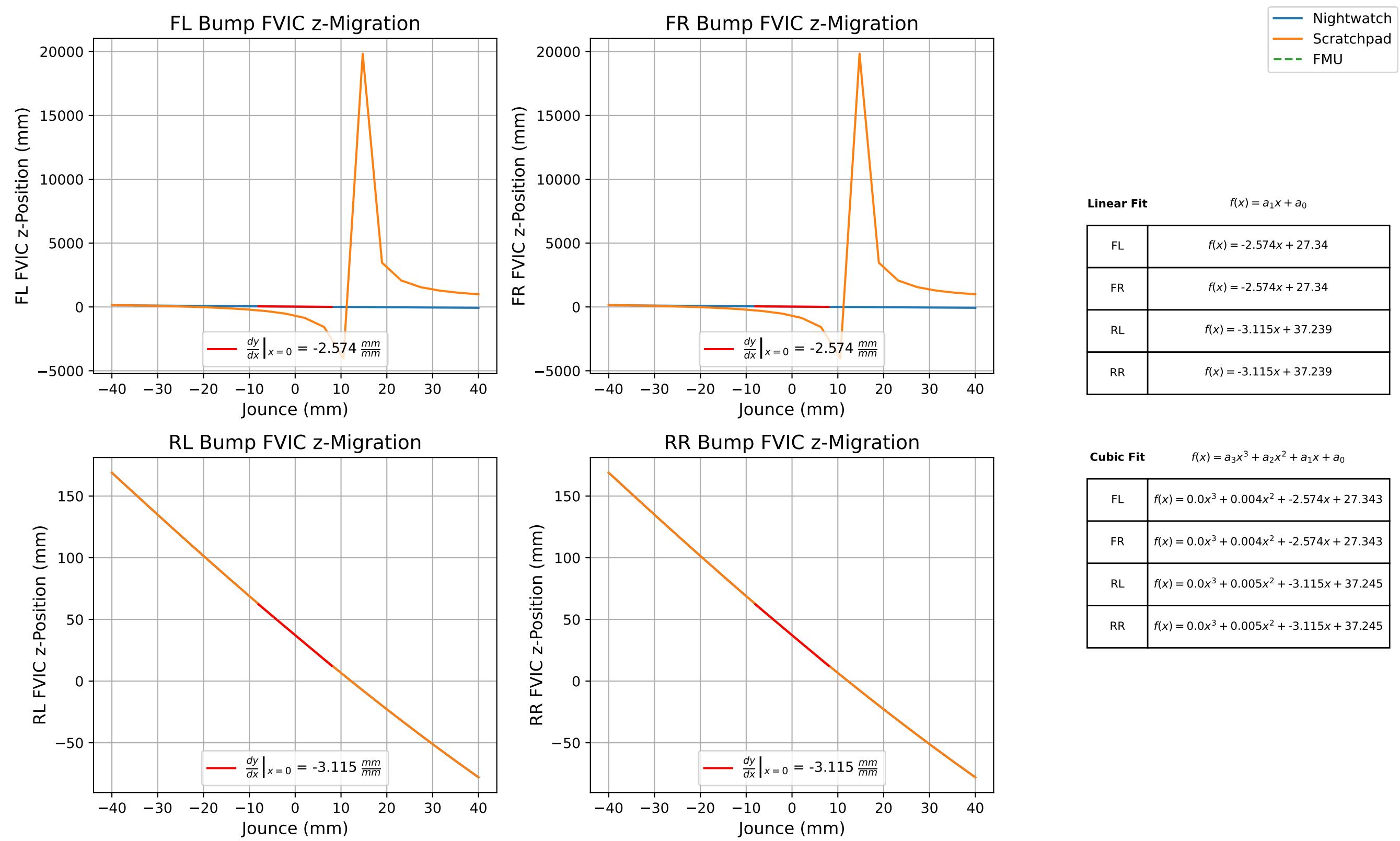


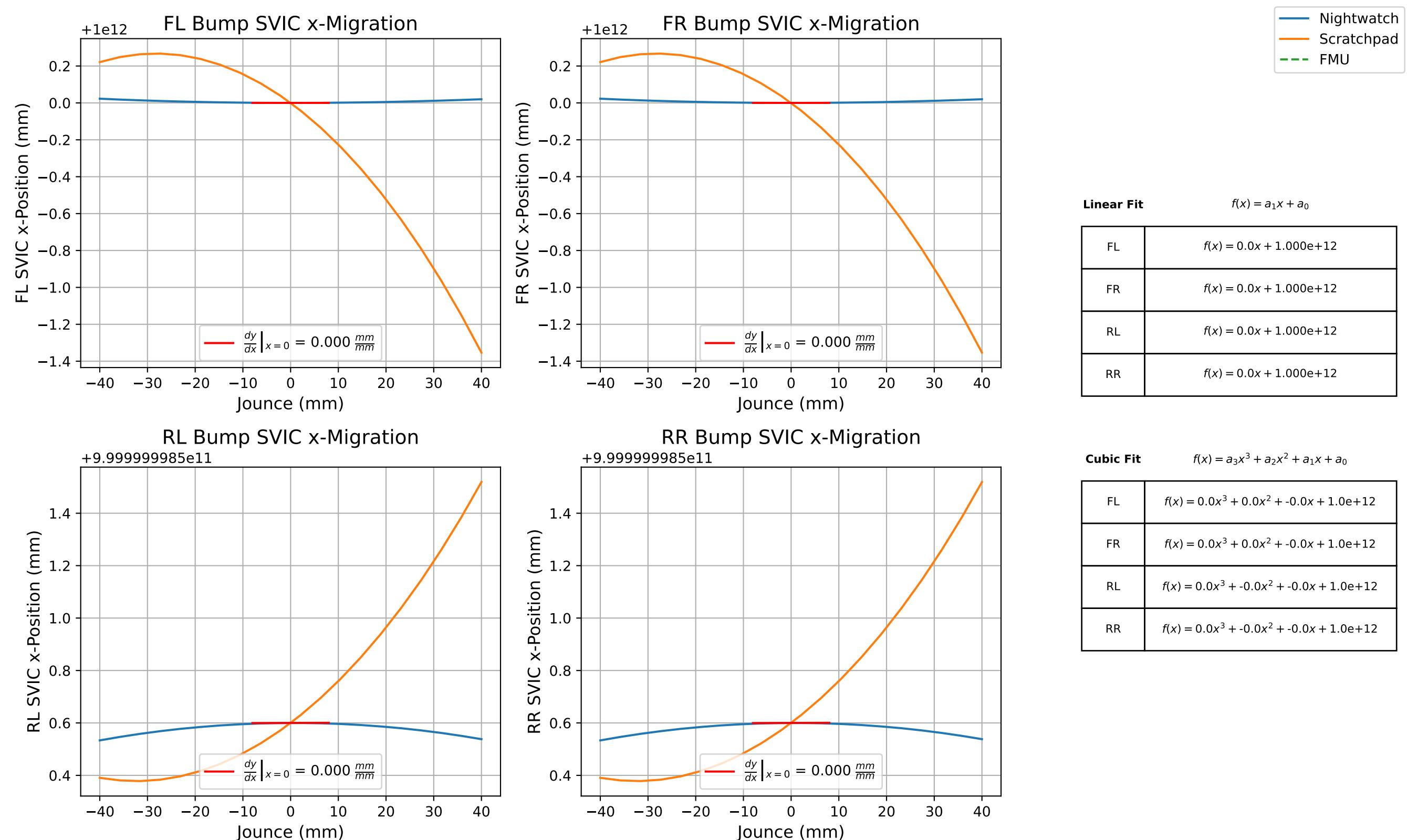
Cubic Fit

$$f(x) = a_3x^3 + a_2x^2 + a_1x + a_0$$

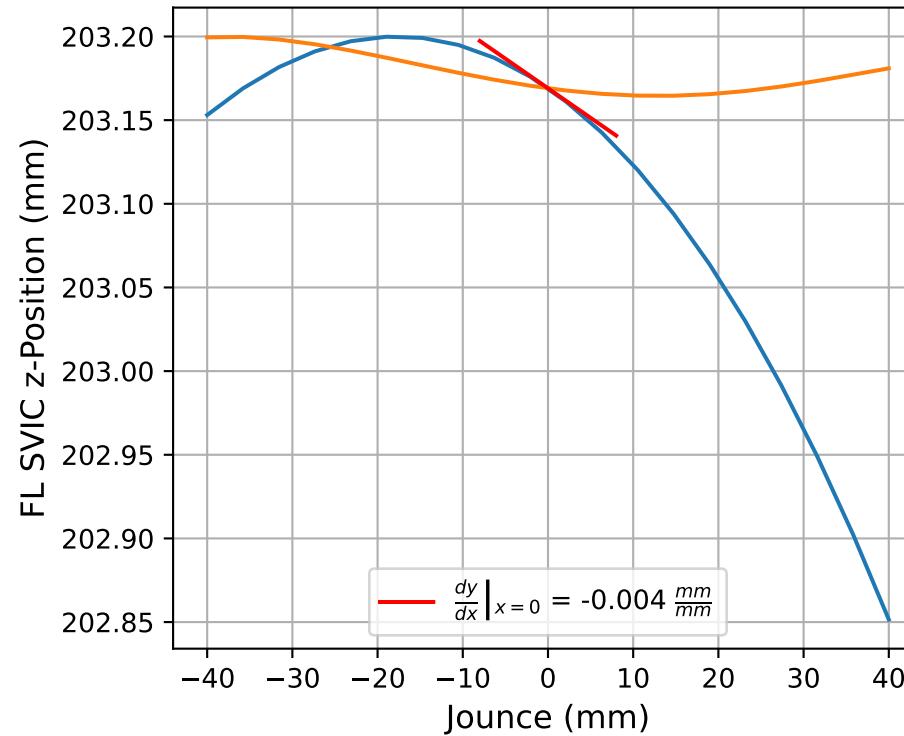
FL	$f(x) = 0.0x^3 + 0.0x^2 + 0.006x + 27.442$
FR	$f(x) = 0.0x^3 + 0.0x^2 + 0.006x + 27.442$
RL	$f(x) = 0.0x^3 + 0.0x^2 + 0.002x + 13.593$
RR	$f(x) = 0.0x^3 + 0.0x^2 + 0.002x + 13.593$



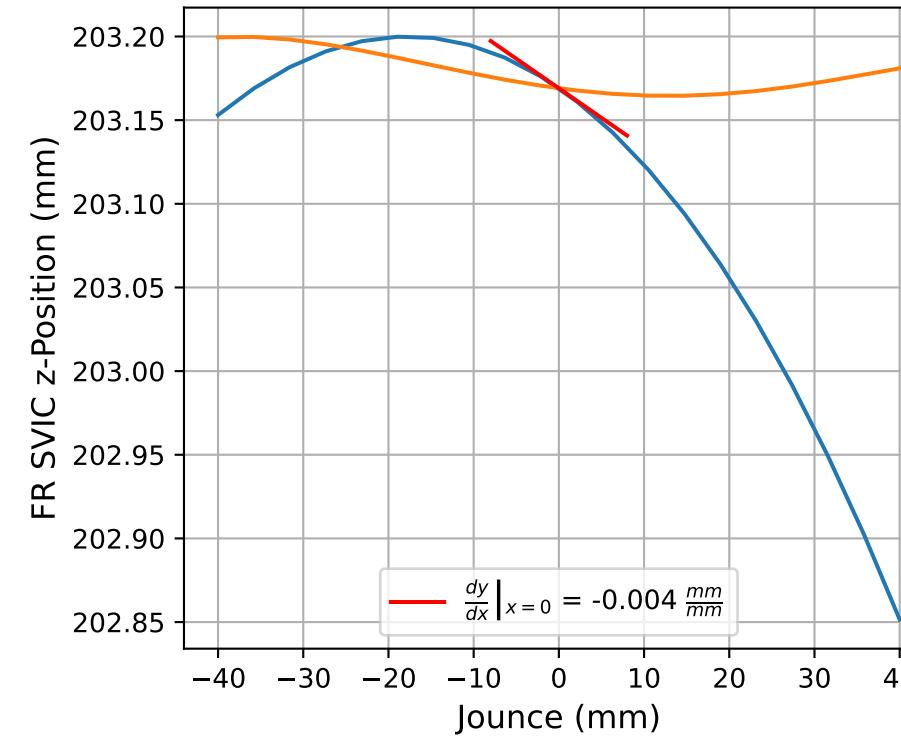




FL Bump SVIC z-Migration



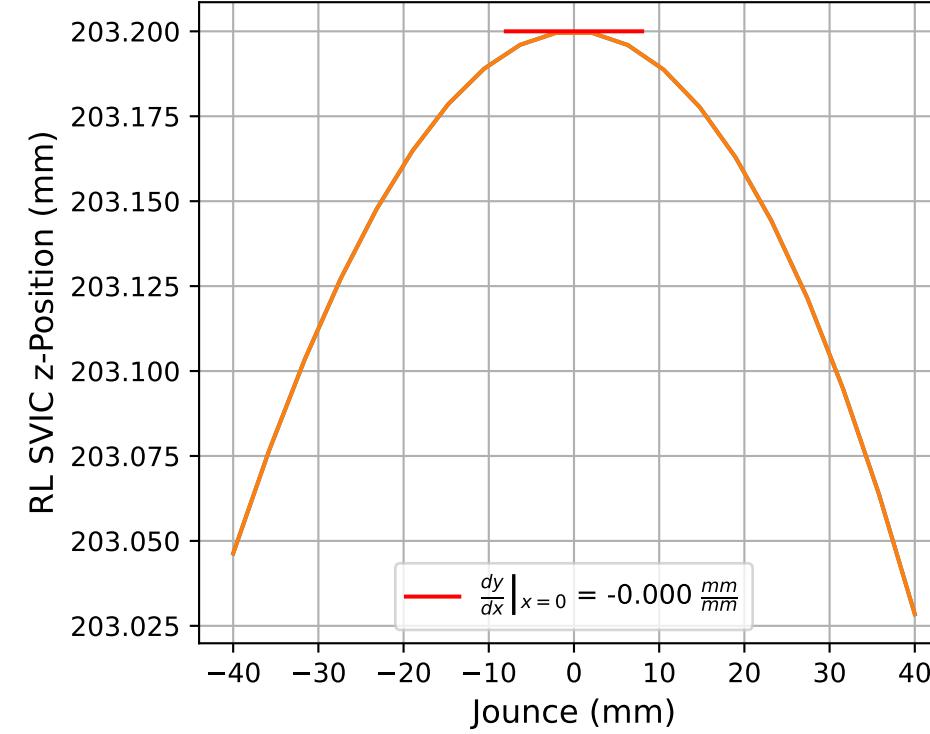
FR Bump SVIC z-Migration

**Linear Fit**

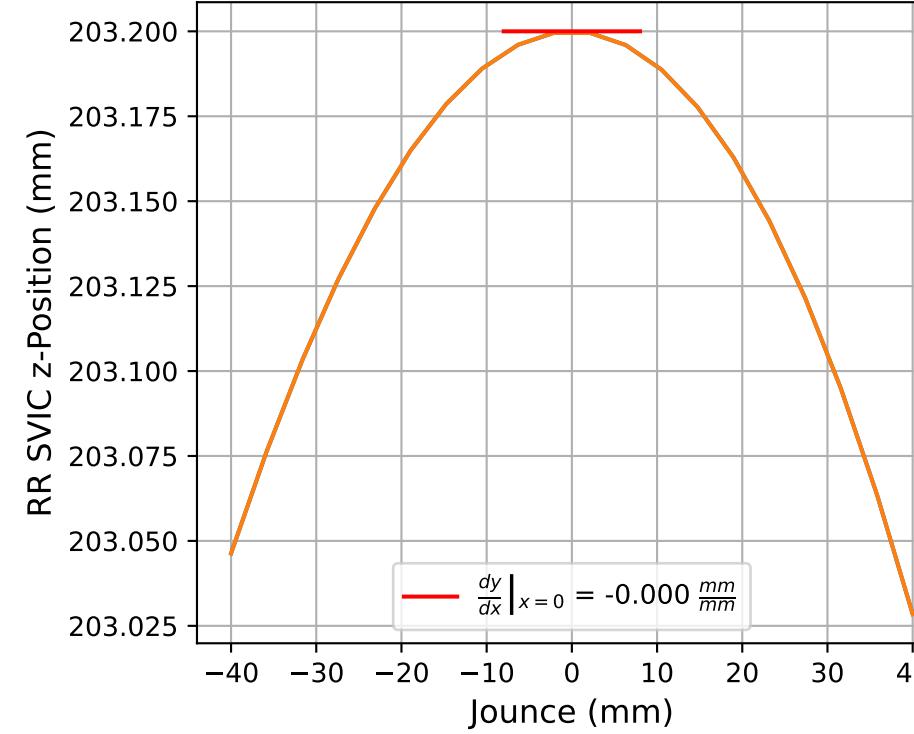
$$f(x) = a_1 x + a_0$$

FL	$f(x) = -0.004x + 203.169$
FR	$f(x) = -0.004x + 203.169$
RL	$f(x) = -0.0x + 203.2$
RR	$f(x) = -0.0x + 203.2$

RL Bump SVIC z-Migration

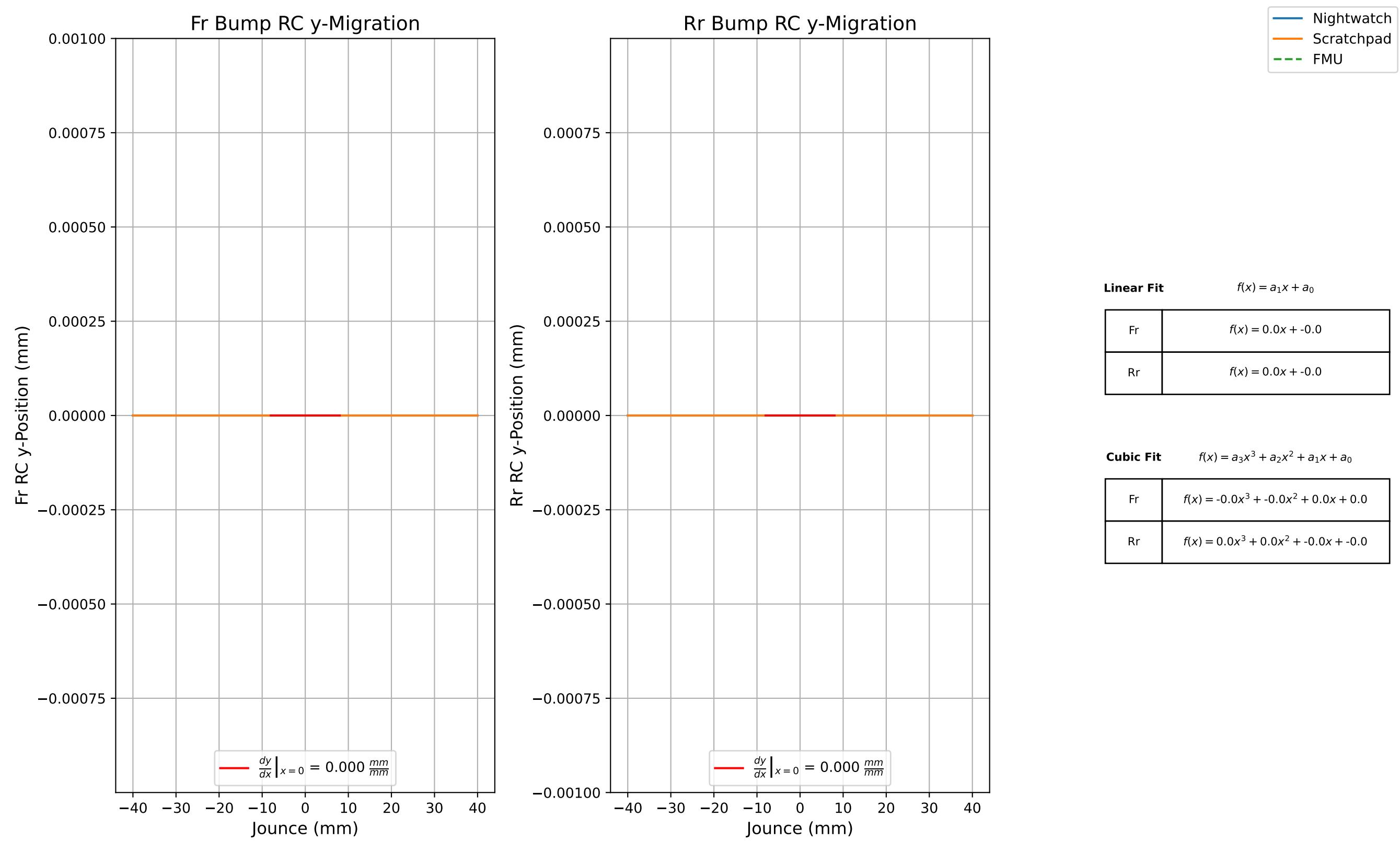


RR Bump SVIC z-Migration

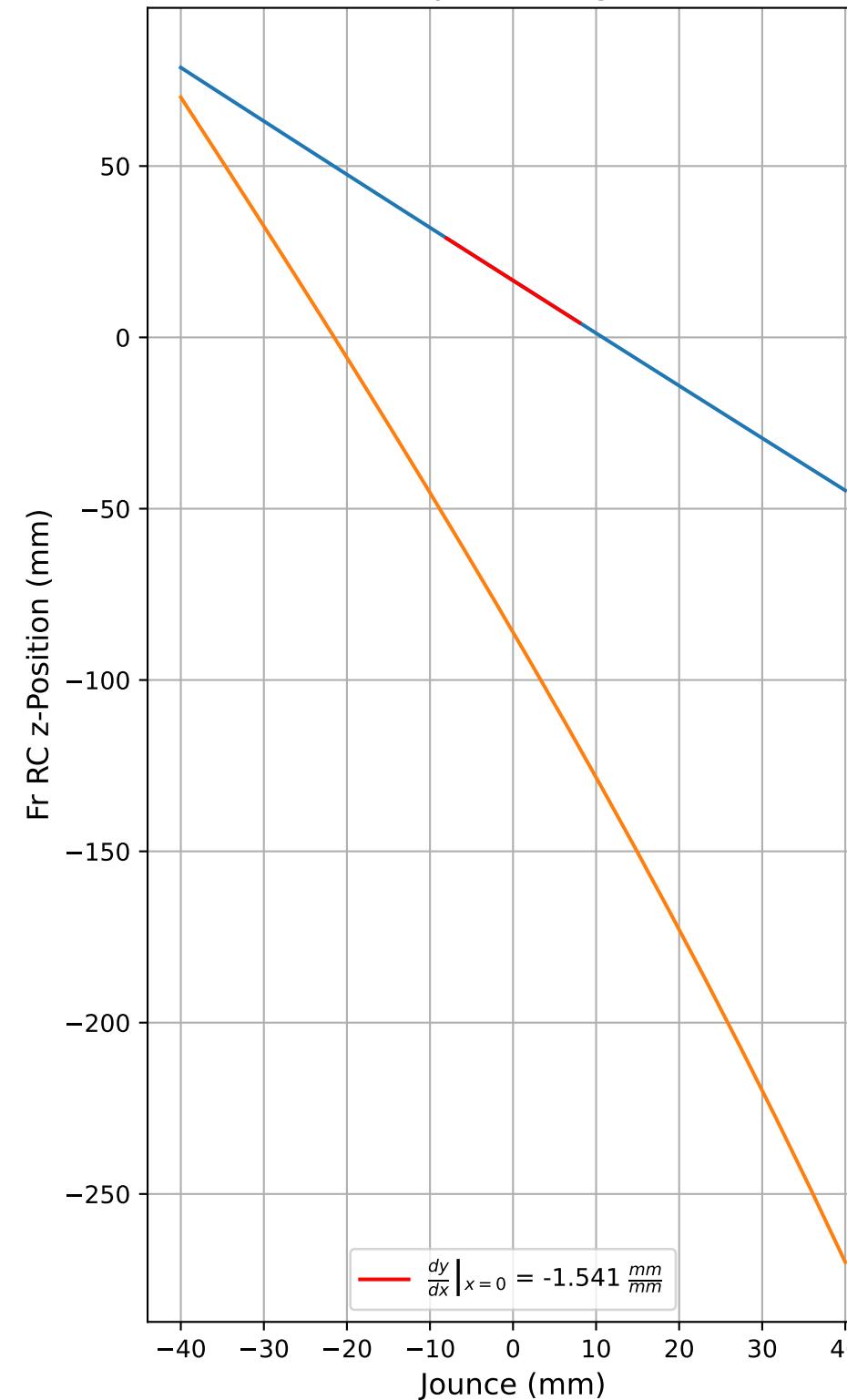
**Cubic Fit**

$$f(x) = a_3 x^3 + a_2 x^2 + a_1 x + a_0$$

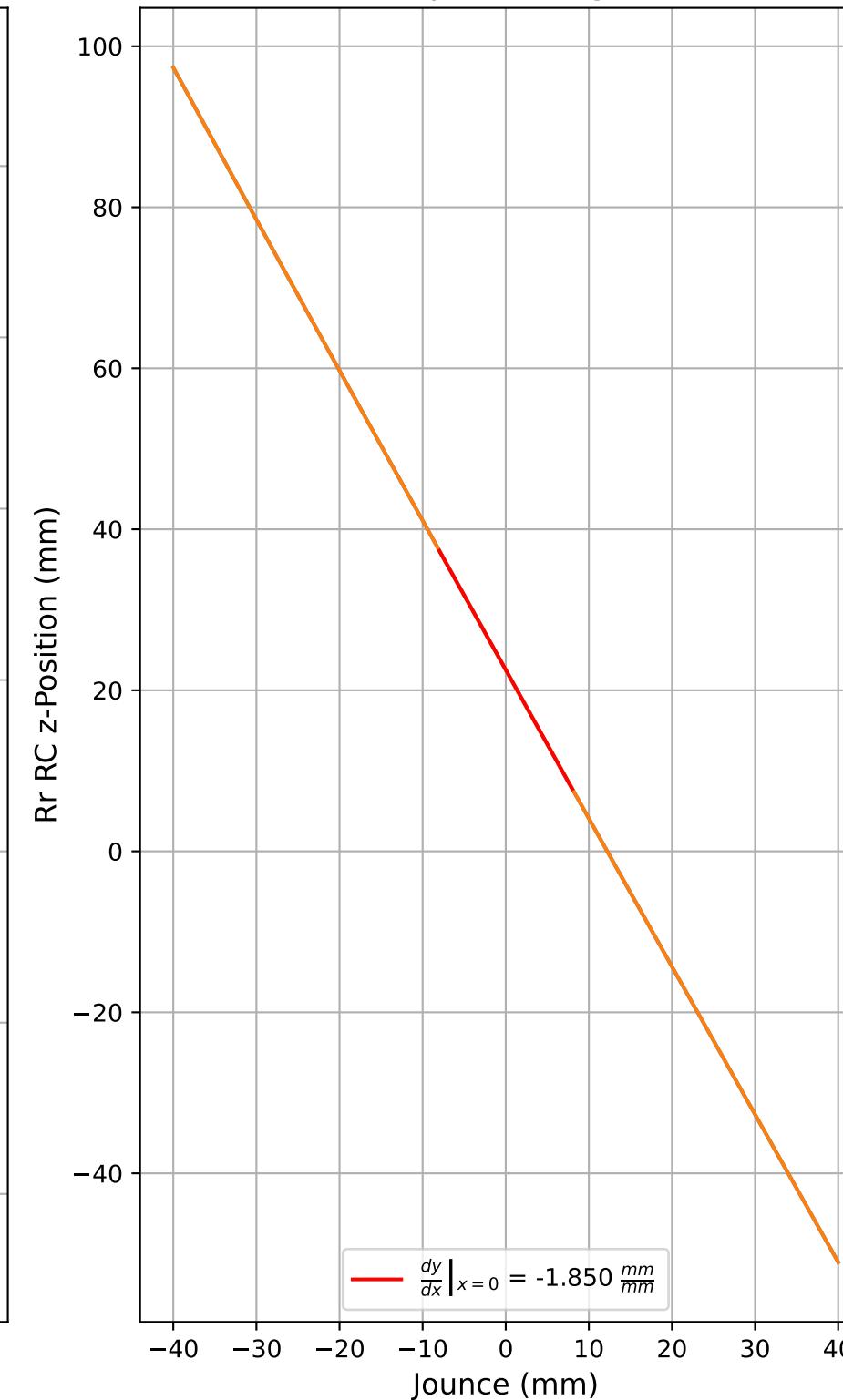
FL	$f(x) = -0.0x^3 + -0.0x^2 + -0.004x + 203.169$
FR	$f(x) = -0.0x^3 + -0.0x^2 + -0.004x + 203.169$
RL	$f(x) = -0.0x^3 + -0.0x^2 + 0.0x + 203.2$
RR	$f(x) = -0.0x^3 + -0.0x^2 + 0.0x + 203.2$



Fr Bump RC z-Migration



Rr Bump RC z-Migration



Linear Fit

$$f(x) = a_1x + a_0$$

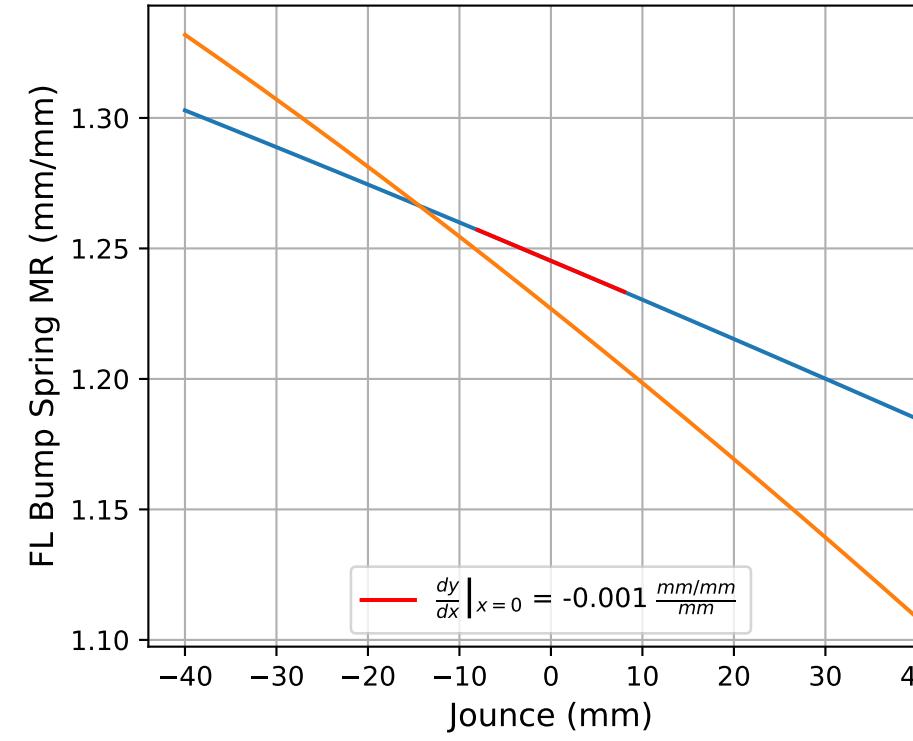
Fr	$f(x) = -1.541x + 16.608$
Rr	$f(x) = -1.85x + 22.543$

Cubic Fit

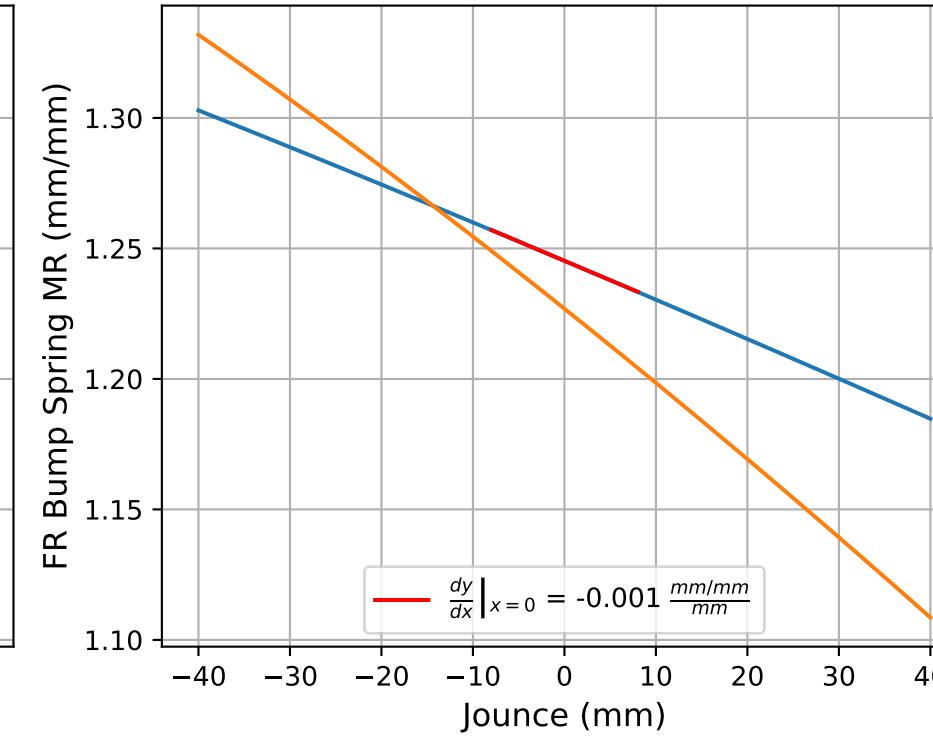
$$f(x) = a_3x^3 + a_2x^2 + a_1x + a_0$$

Fr	$f(x) = -0.0x^3 + 0.0x^2 + -1.541x + 16.607$
Rr	$f(x) = -0.0x^3 + 0.0x^2 + -1.85x + 22.541$

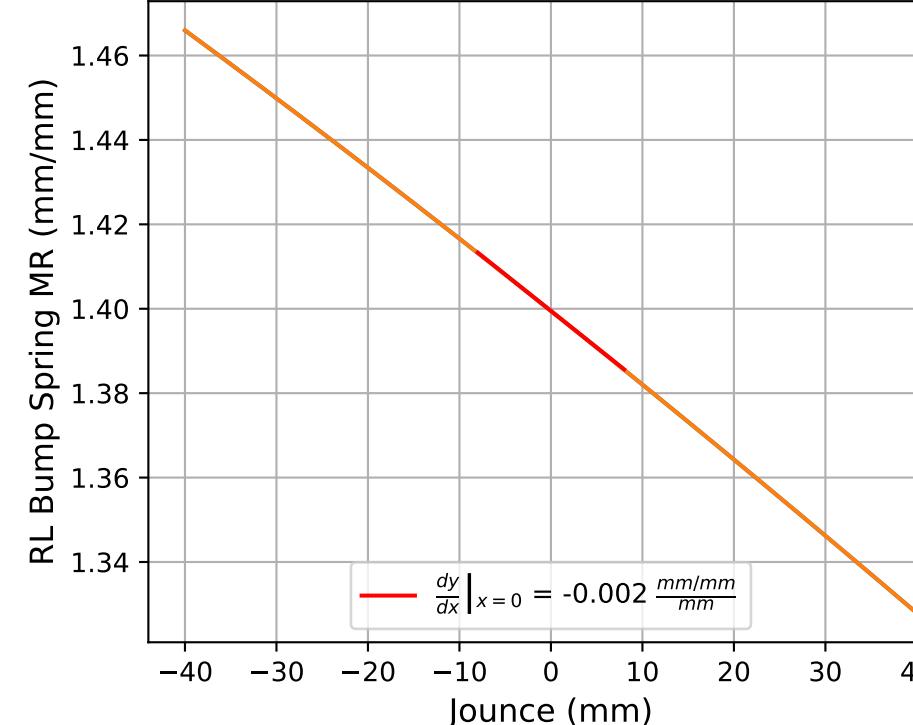
FL Bump Spring MRs



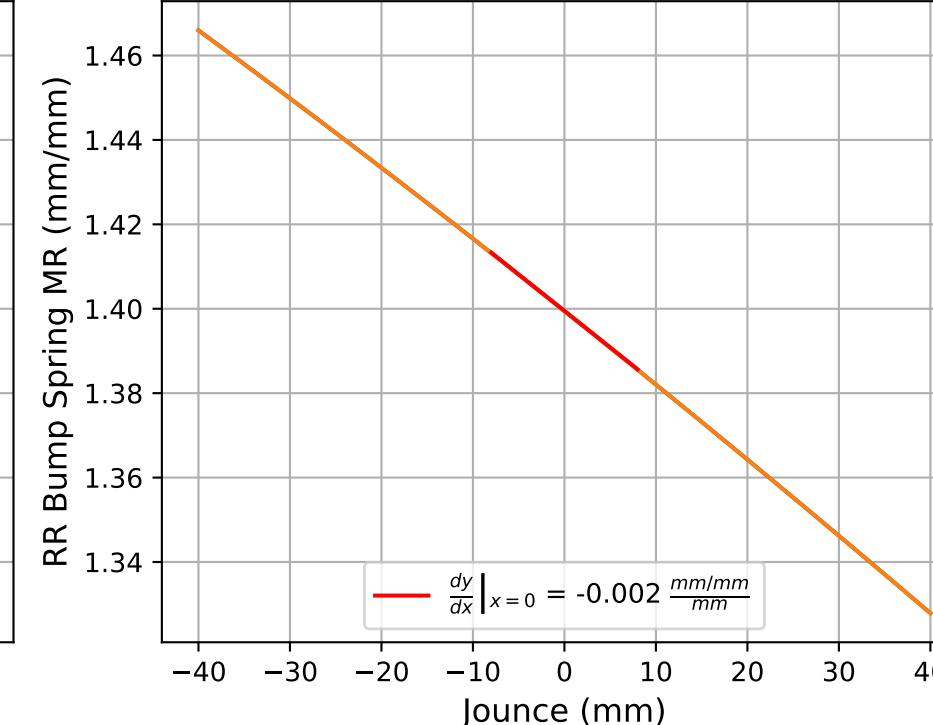
FR Bump Spring MRs



RL Bump Spring MRs



RR Bump Spring MRs



Nightwatch
Scratchpad
FMU

Linear Fit

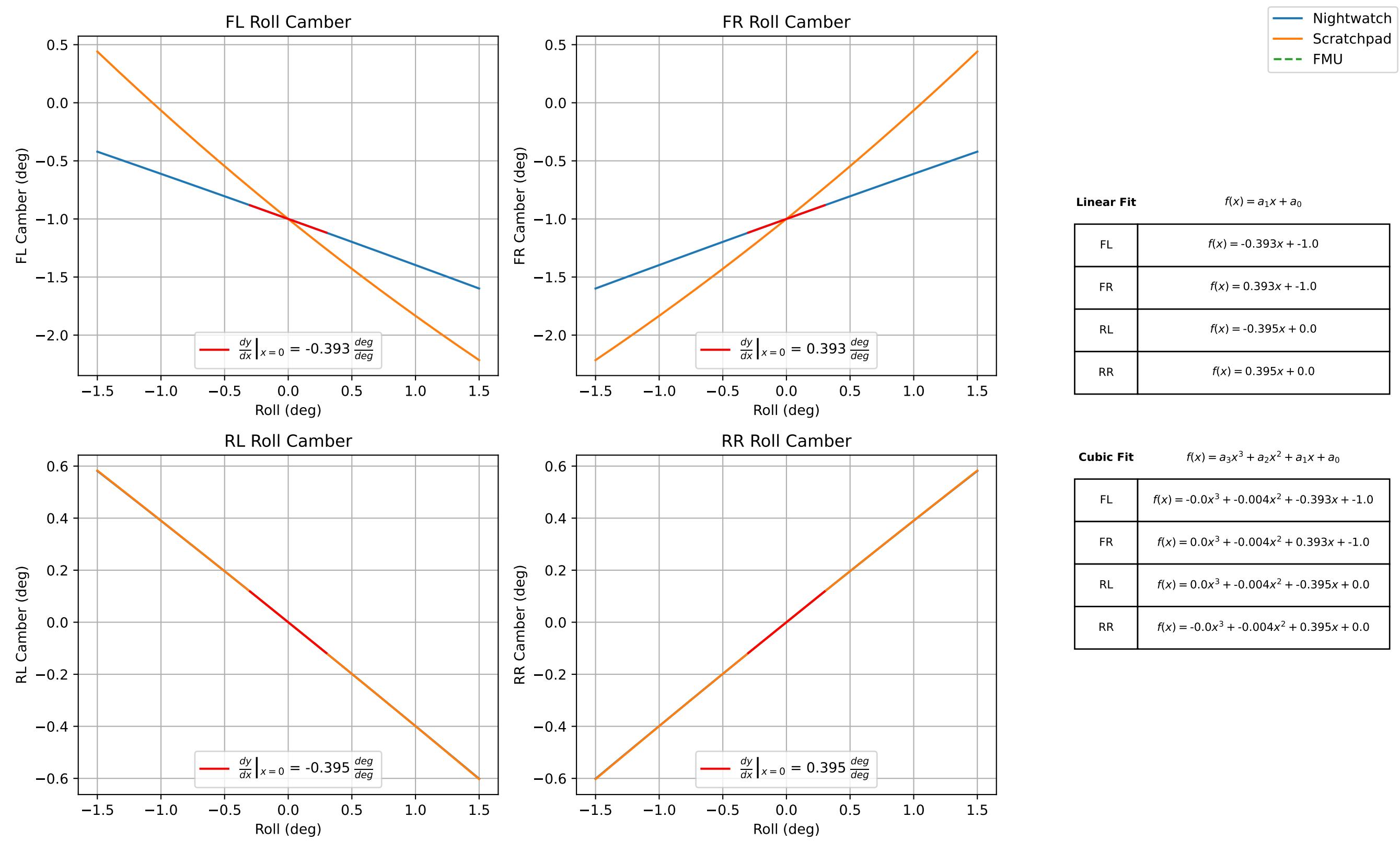
$$f(x) = a_1x + a_0$$

FL	$f(x) = -0.001x + 1.245$
FR	$f(x) = -0.001x + 1.245$
RL	$f(x) = -0.002x + 1.399$
RR	$f(x) = -0.002x + 1.399$

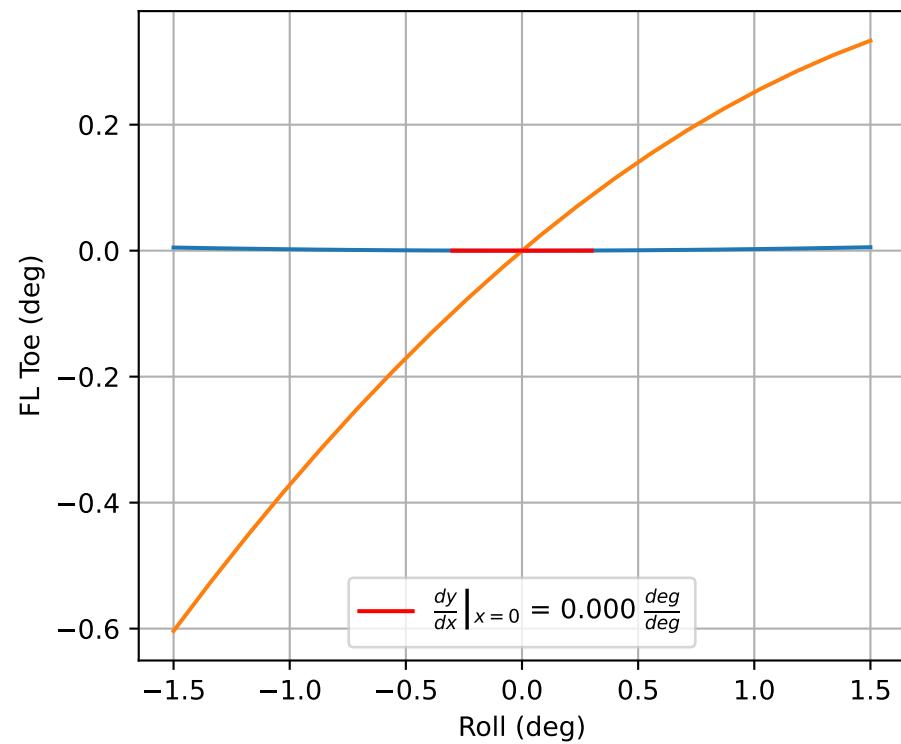
Cubic Fit

$$f(x) = a_3x^3 + a_2x^2 + a_1x + a_0$$

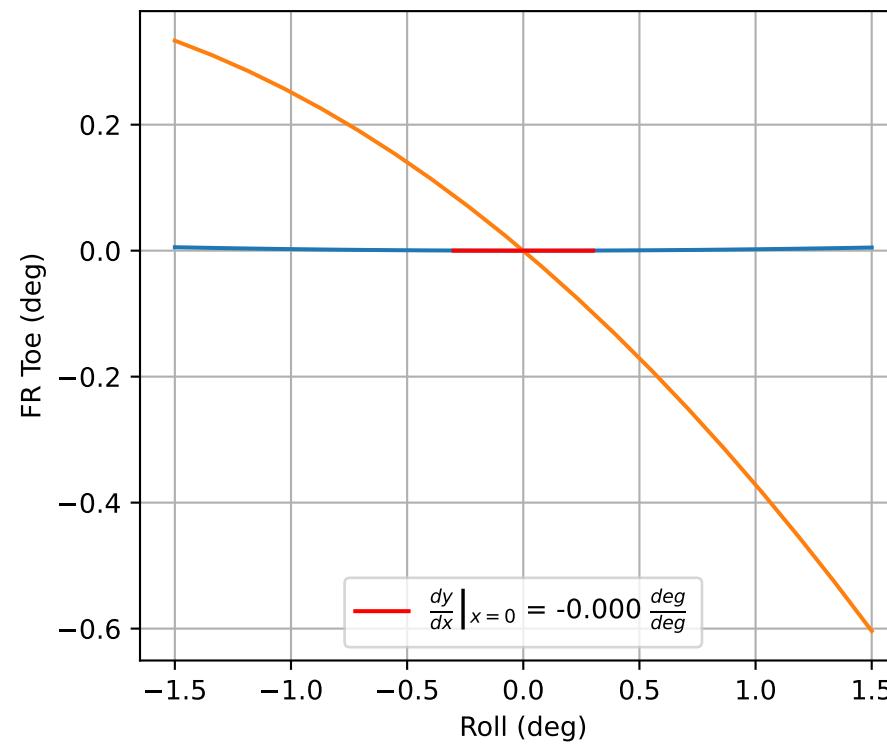
FL	$f(x) = 0.0x^3 + -0.0x^2 + -0.001x + 1.245$
FR	$f(x) = 0.0x^3 + -0.0x^2 + -0.001x + 1.245$
RL	$f(x) = 0.0x^3 + -0.0x^2 + -0.002x + 1.399$
RR	$f(x) = 0.0x^3 + -0.0x^2 + -0.002x + 1.399$



FL Roll Toe



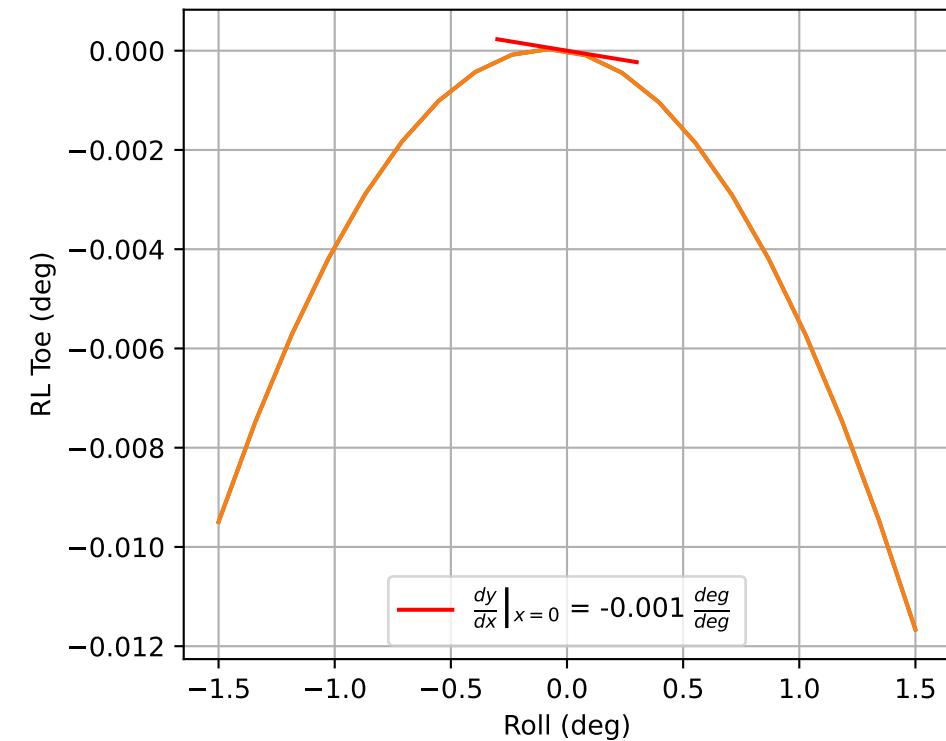
FR Roll Toe

**Linear Fit**

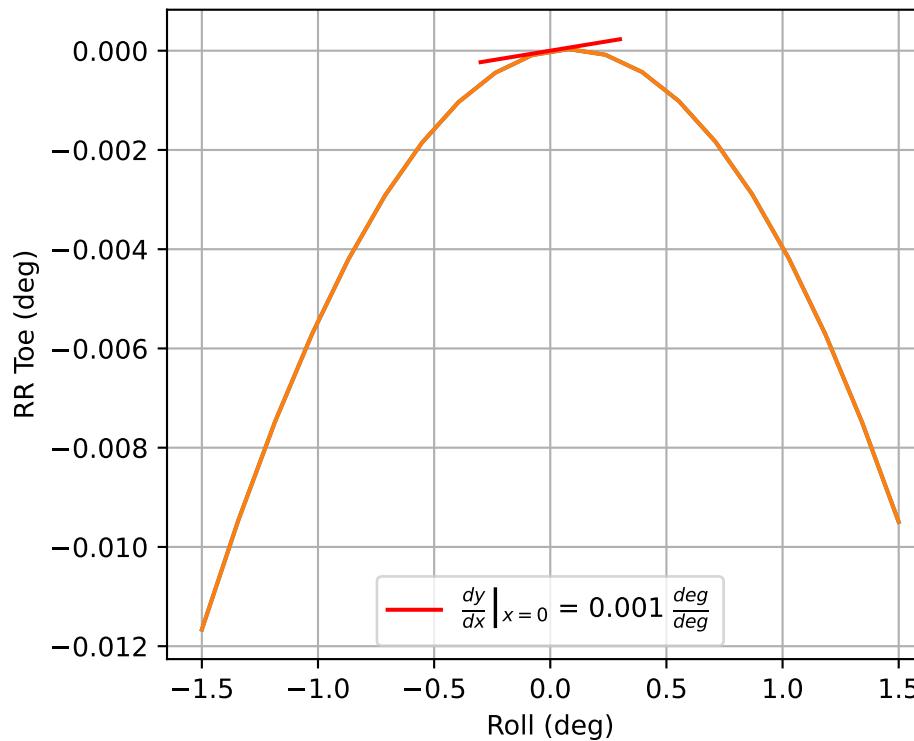
$$f(x) = a_1x + a_0$$

FL	$f(x) = 0.0x + -0.0$
FR	$f(x) = -0.0x + -0.0$
RL	$f(x) = -0.001x + 0.0$
RR	$f(x) = 0.001x + 0.0$

RL Roll Toe

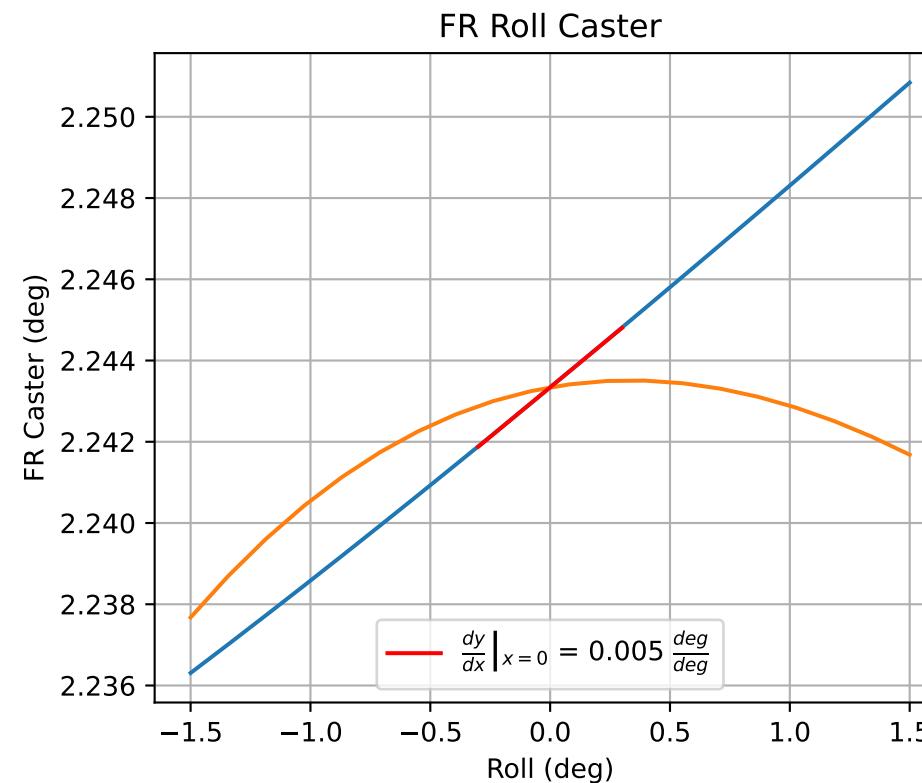
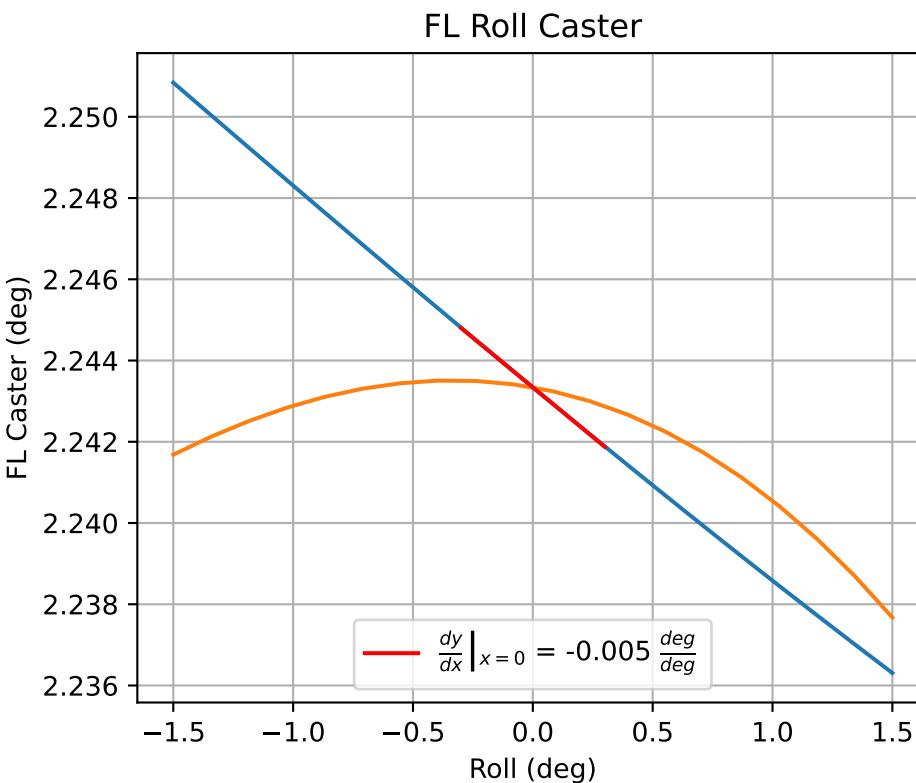


RR Roll Toe

**Cubic Fit**

$$f(x) = a_3x^3 + a_2x^2 + a_1x + a_0$$

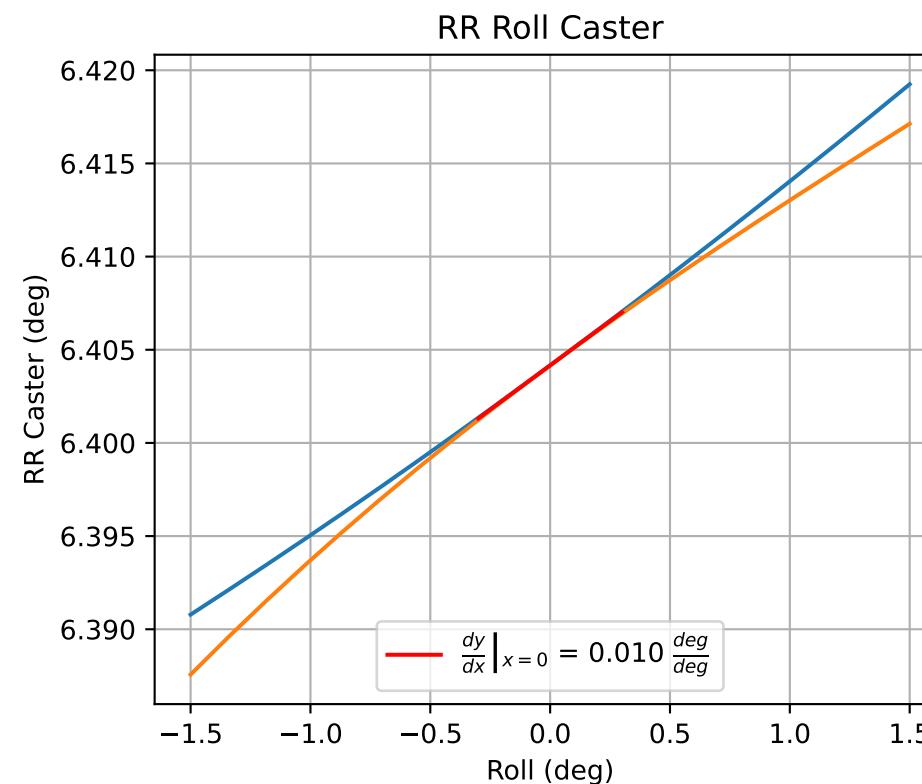
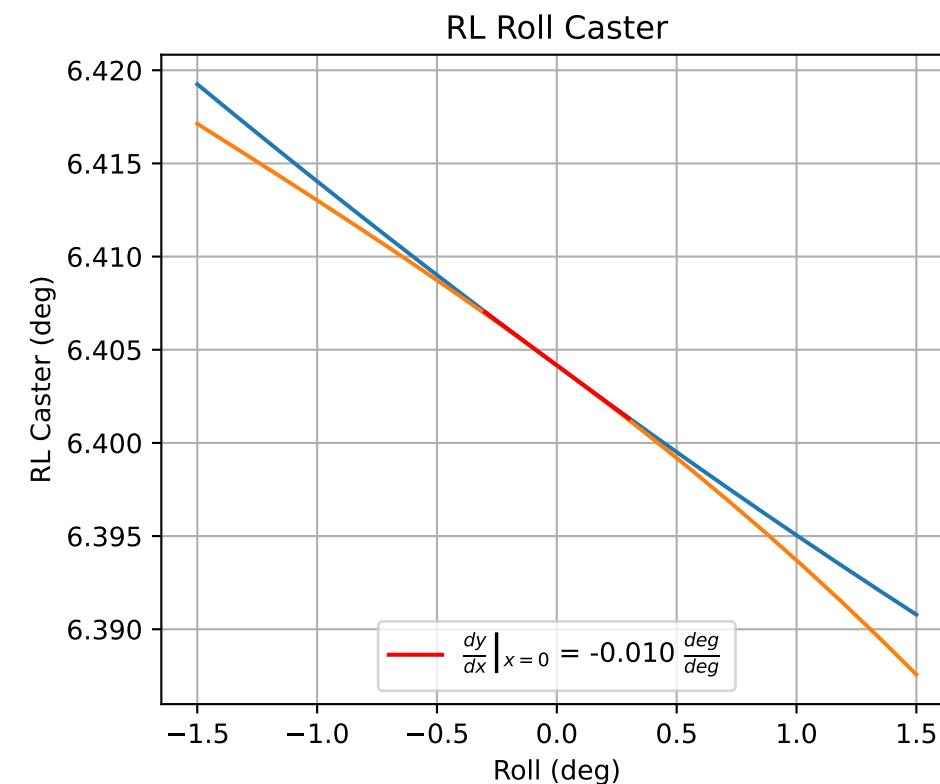
FL	$f(x) = 0.0x^3 + 0.002x^2 + 0.0x + -0.0$
FR	$f(x) = -0.0x^3 + 0.002x^2 + -0.0x + -0.0$
RL	$f(x) = 0.0x^3 + -0.005x^2 + -0.001x + 0.0$
RR	$f(x) = -0.0x^3 + -0.005x^2 + 0.001x + 0.0$



Linear Fit

$$f(x) = a_1x + a_0$$

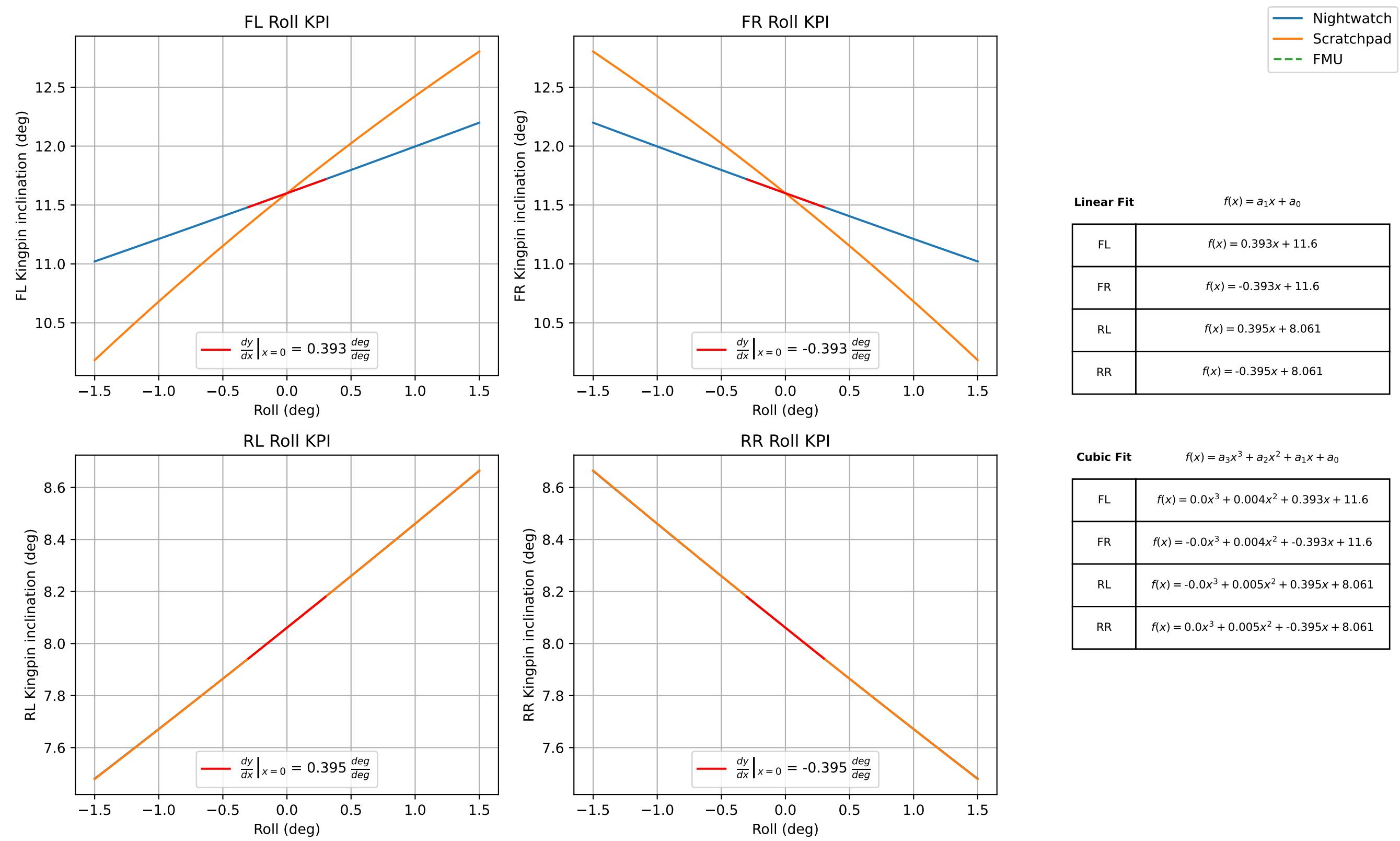
FL	$f(x) = -0.005x + 2.243$
FR	$f(x) = 0.005x + 2.243$
RL	$f(x) = -0.01x + 6.404$
RR	$f(x) = 0.01x + 6.404$



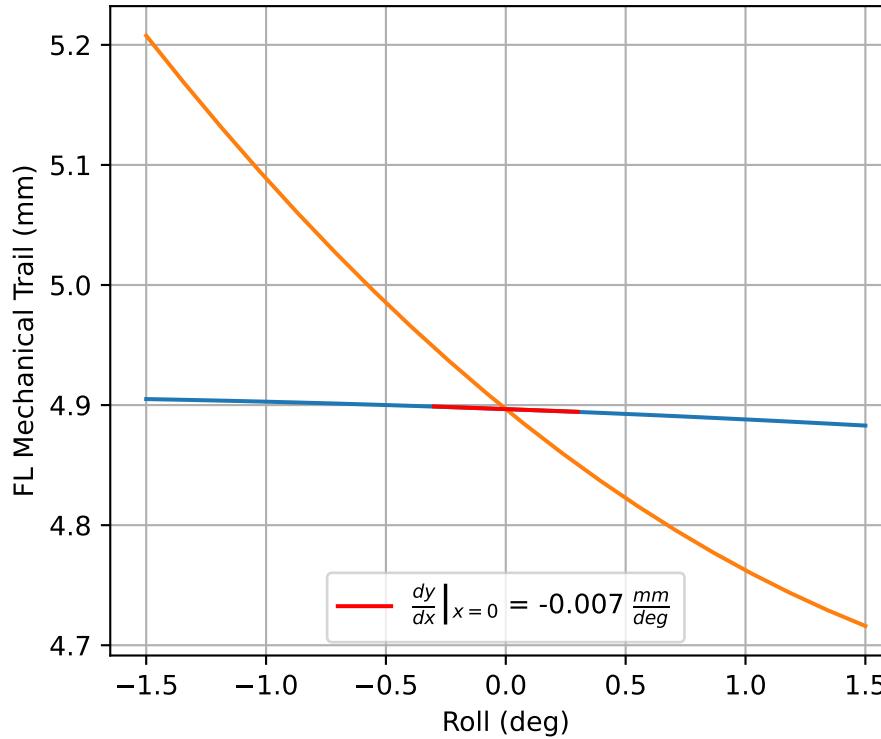
Cubic Fit

$$f(x) = a_3x^3 + a_2x^2 + a_1x + a_0$$

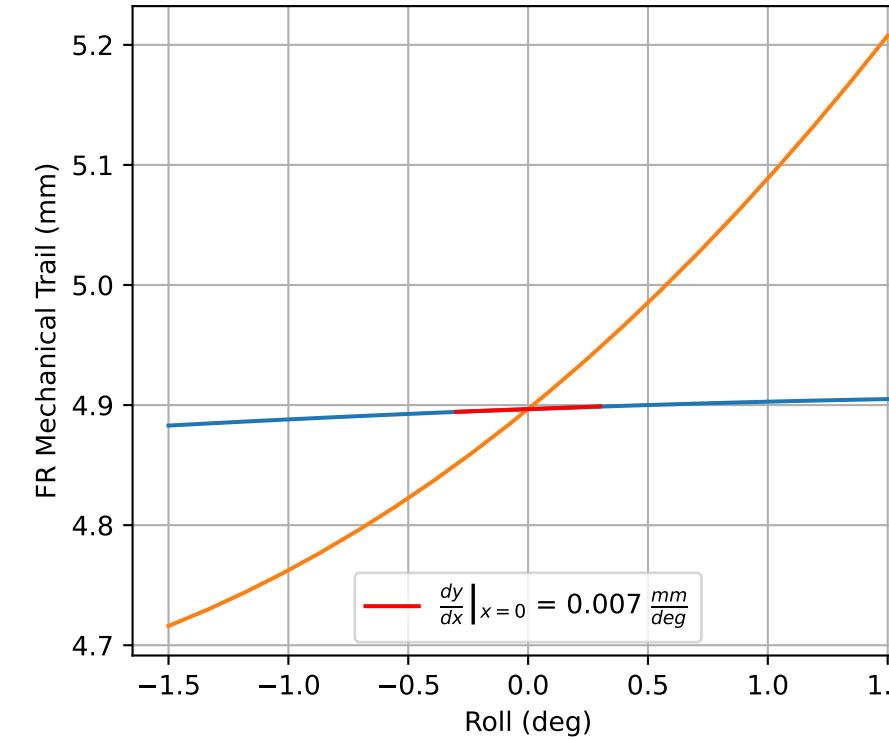
FL	$f(x) = 0.0x^3 + 0.0x^2 + -0.005x + 2.243$
FR	$f(x) = -0.0x^3 + 0.0x^2 + 0.005x + 2.243$
RL	$f(x) = 0.0x^3 + 0.0x^2 + -0.01x + 6.404$
RR	$f(x) = -0.0x^3 + 0.0x^2 + 0.01x + 6.404$



FL Roll Mechanical Trail



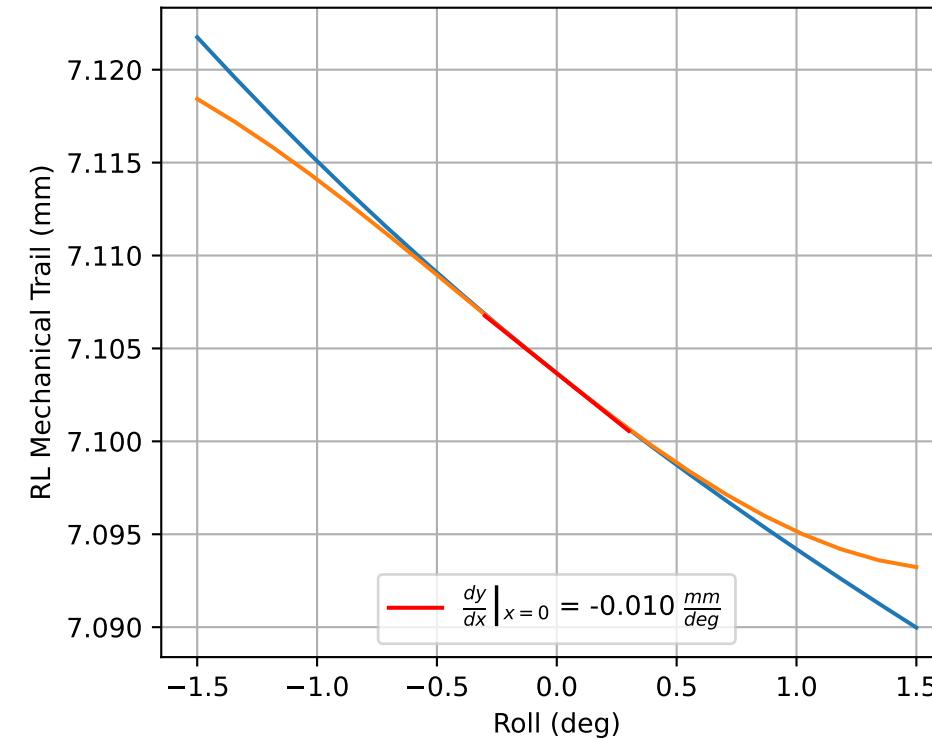
FR Roll Mechanical Trail

**Linear Fit**

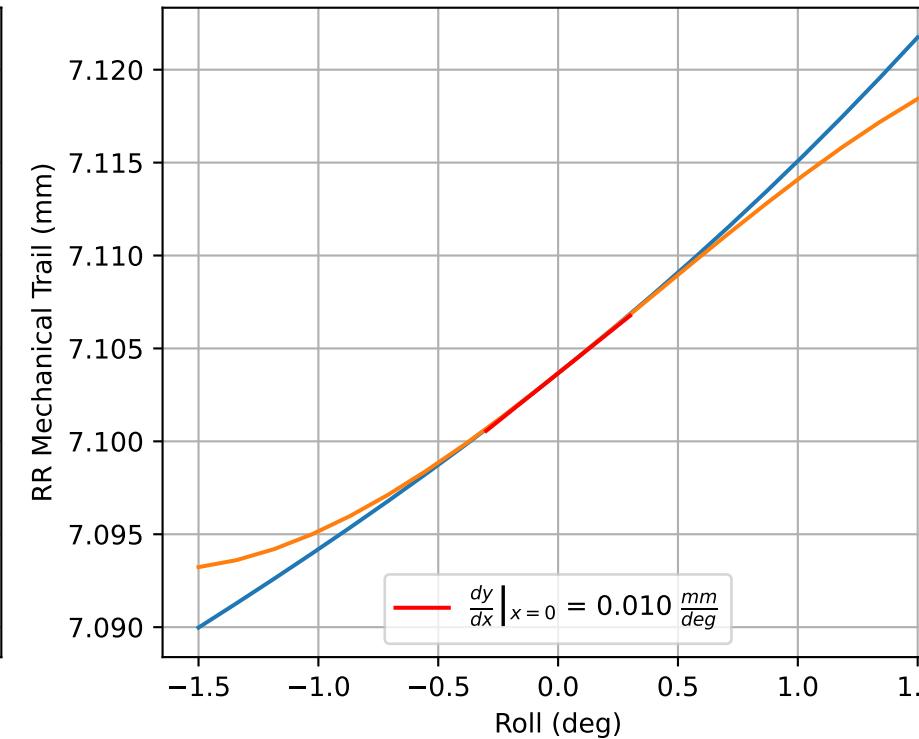
$$f(x) = a_1x + a_0$$

FL	$f(x) = -0.007x + 4.897$
FR	$f(x) = 0.007x + 4.897$
RL	$f(x) = -0.01x + 7.104$
RR	$f(x) = 0.01x + 7.104$

RL Roll Mechanical Trail



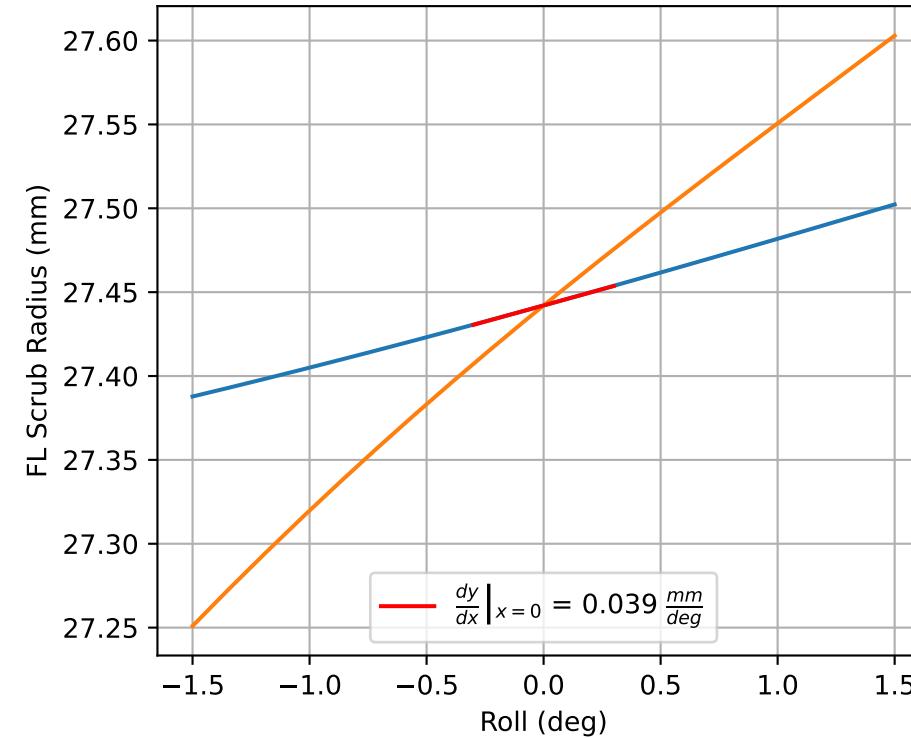
RR Roll Mechanical Trail

**Cubic Fit**

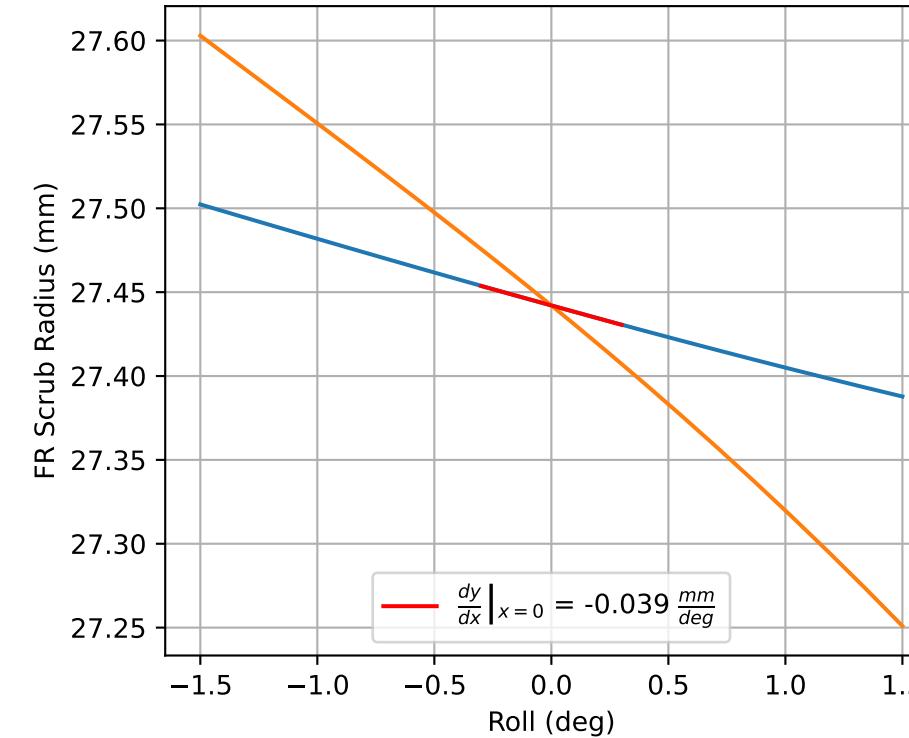
$$f(x) = a_3x^3 + a_2x^2 + a_1x + a_0$$

FL	$f(x) = 0.0x^3 + -0.001x^2 + -0.007x + 4.897$
FR	$f(x) = -0.0x^3 + -0.001x^2 + 0.007x + 4.897$
RL	$f(x) = -0.0x^3 + 0.001x^2 + -0.01x + 7.104$
RR	$f(x) = 0.0x^3 + 0.001x^2 + 0.01x + 7.104$

FL Roll Scrub Radius



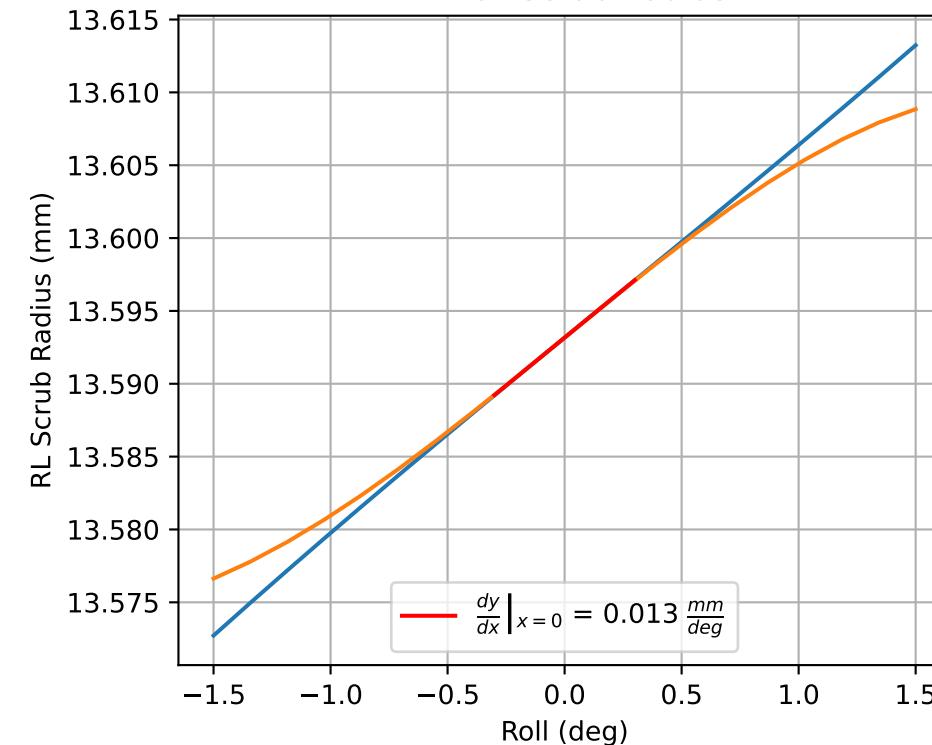
FR Roll Scrub Radius

**Linear Fit**

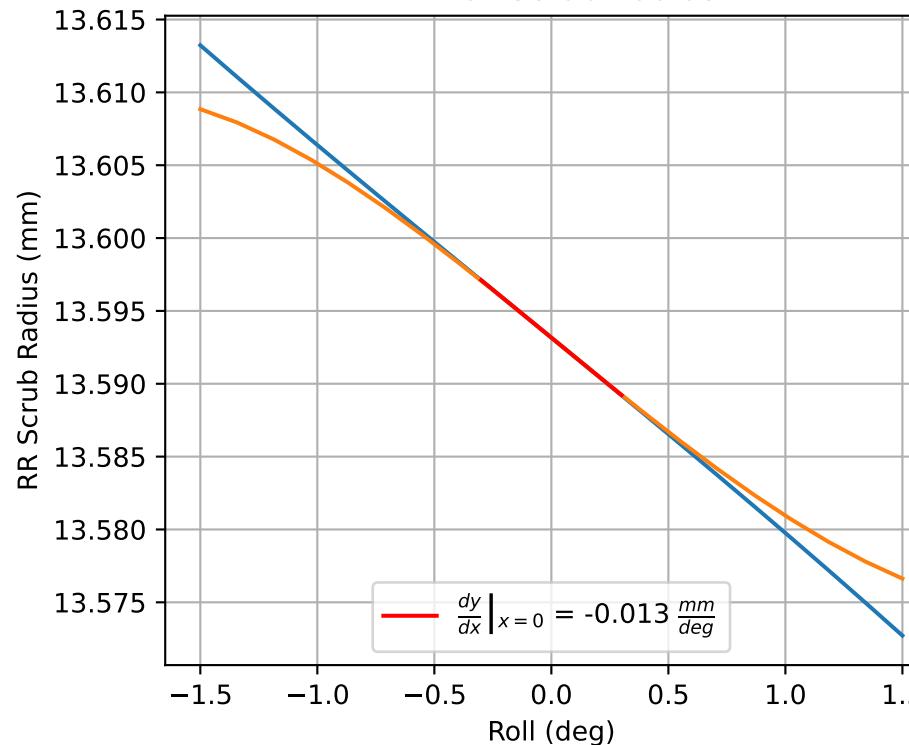
$$f(x) = a_1x + a_0$$

FL	$f(x) = 0.039x + 27.442$
FR	$f(x) = -0.039x + 27.442$
RL	$f(x) = 0.013x + 13.593$
RR	$f(x) = -0.013x + 13.593$

RL Roll Scrub Radius

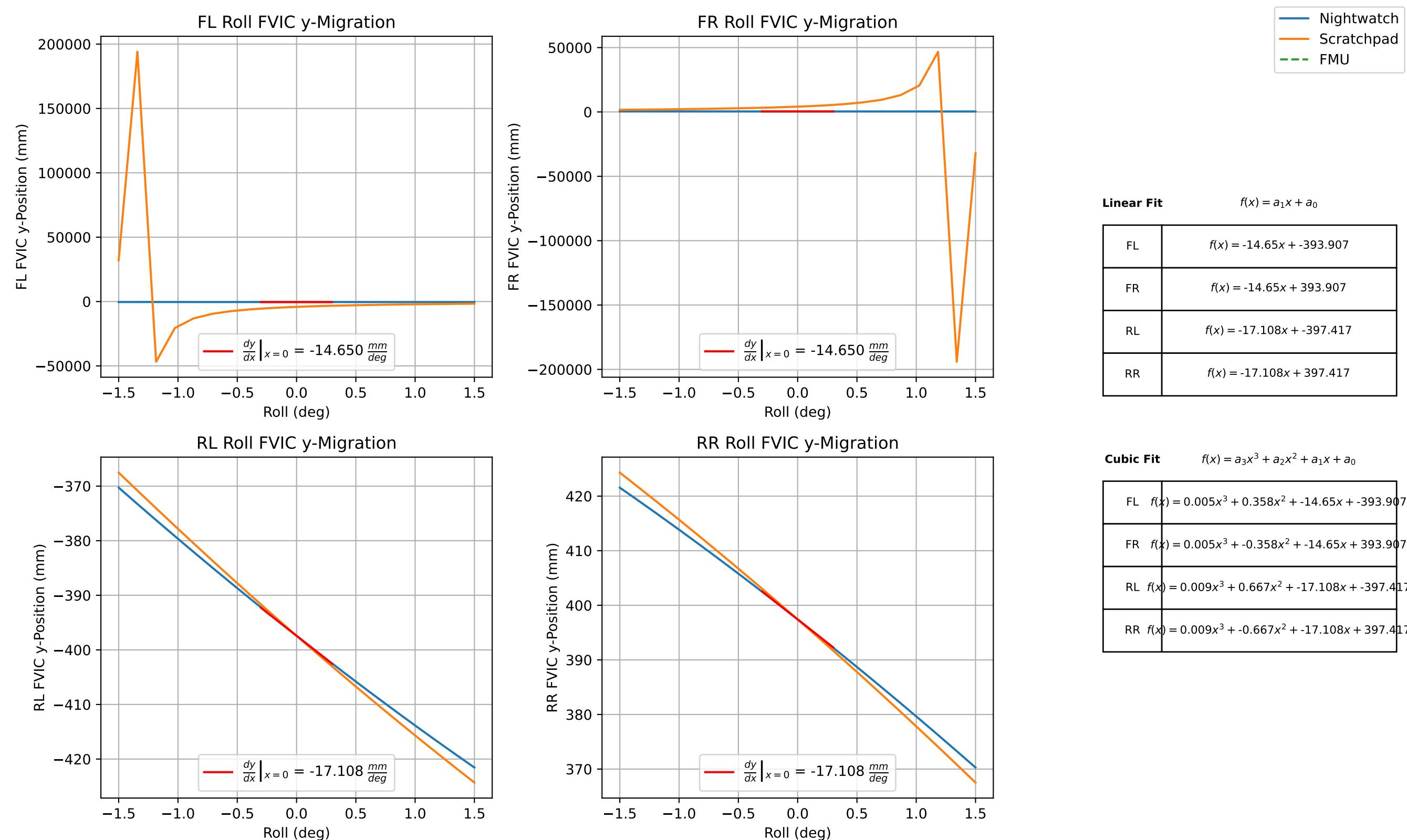


RR Roll Scrub Radius

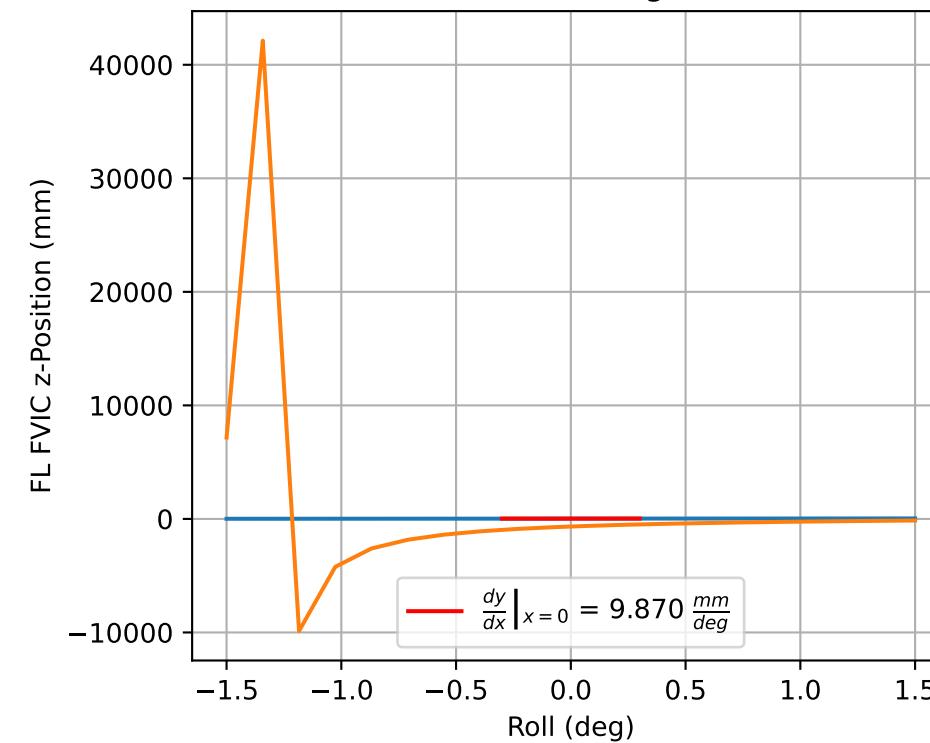
**Cubic Fit**

$$f(x) = a_3x^3 + a_2x^2 + a_1x + a_0$$

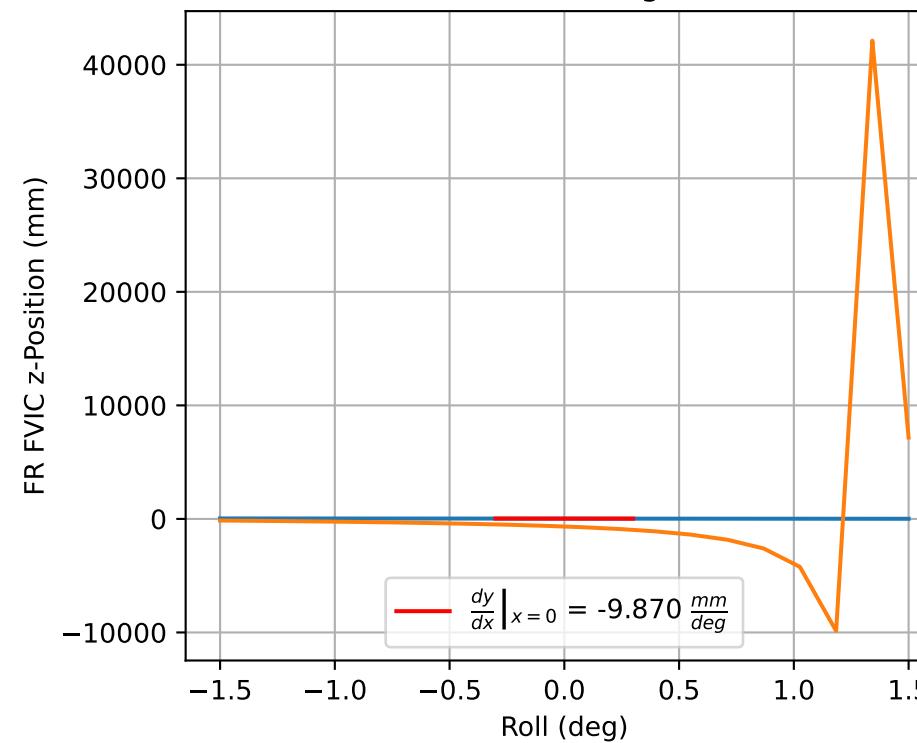
FL	$f(x) = -0.0x^3 + 0.001x^2 + 0.039x + 27.442$
FR	$f(x) = 0.0x^3 + 0.001x^2 - 0.039x + 27.442$
RL	$f(x) = 0.0x^3 - 0.0x^2 + 0.013x + 13.593$
RR	$f(x) = -0.0x^3 - 0.0x^2 - 0.013x + 13.593$



FL Roll FVIC z-Migration



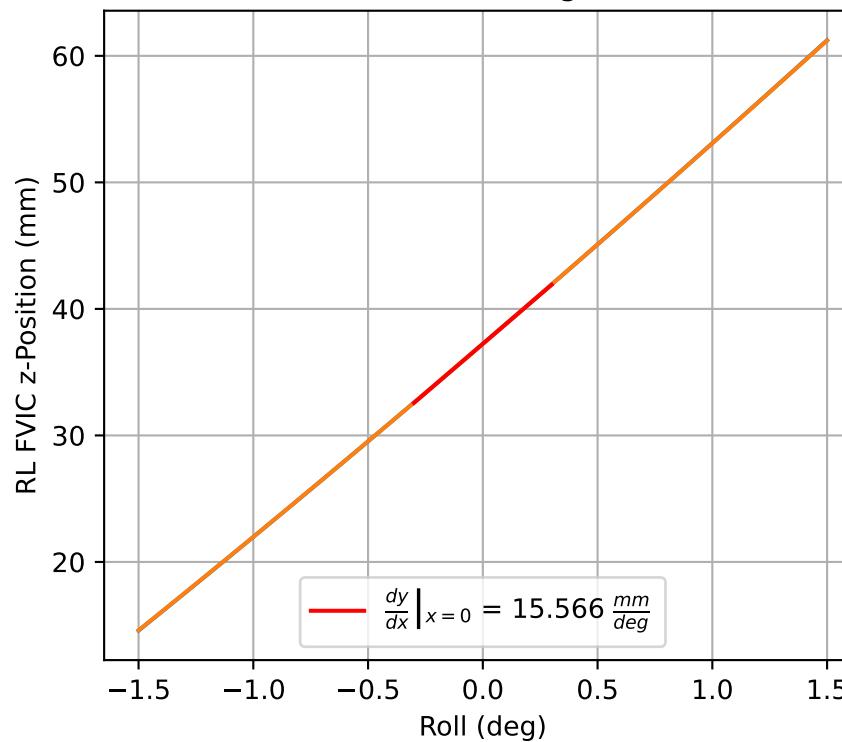
FR Roll FVIC z-Migration

**Linear Fit**

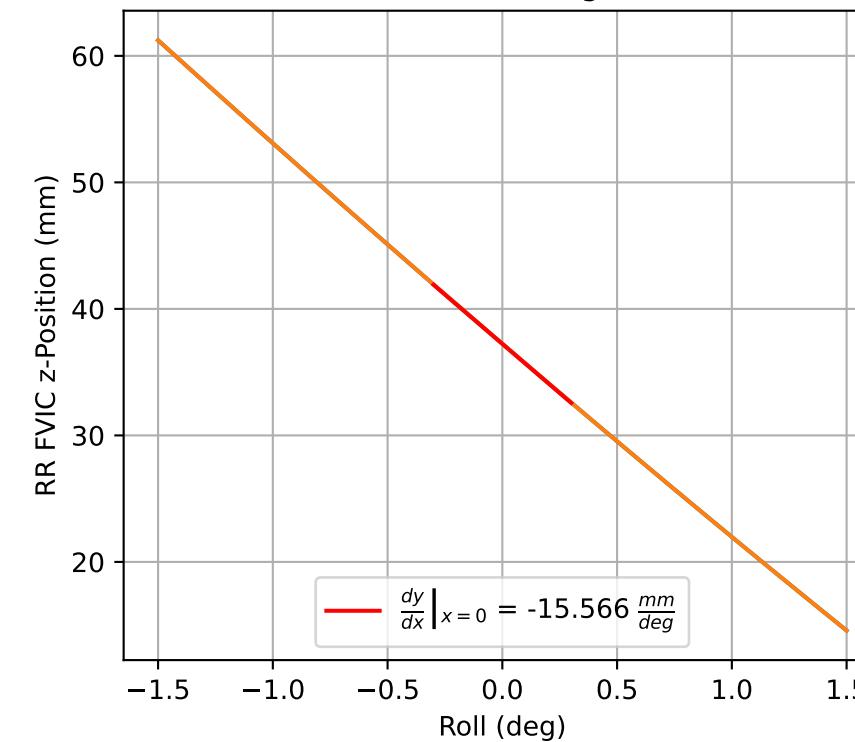
$$f(x) = a_1x + a_0$$

FL	$f(x) = 9.87x + 27.34$
FR	$f(x) = -9.87x + 27.34$
RL	$f(x) = 15.566x + 37.239$
RR	$f(x) = -15.566x + 37.239$

RL Roll FVIC z-Migration

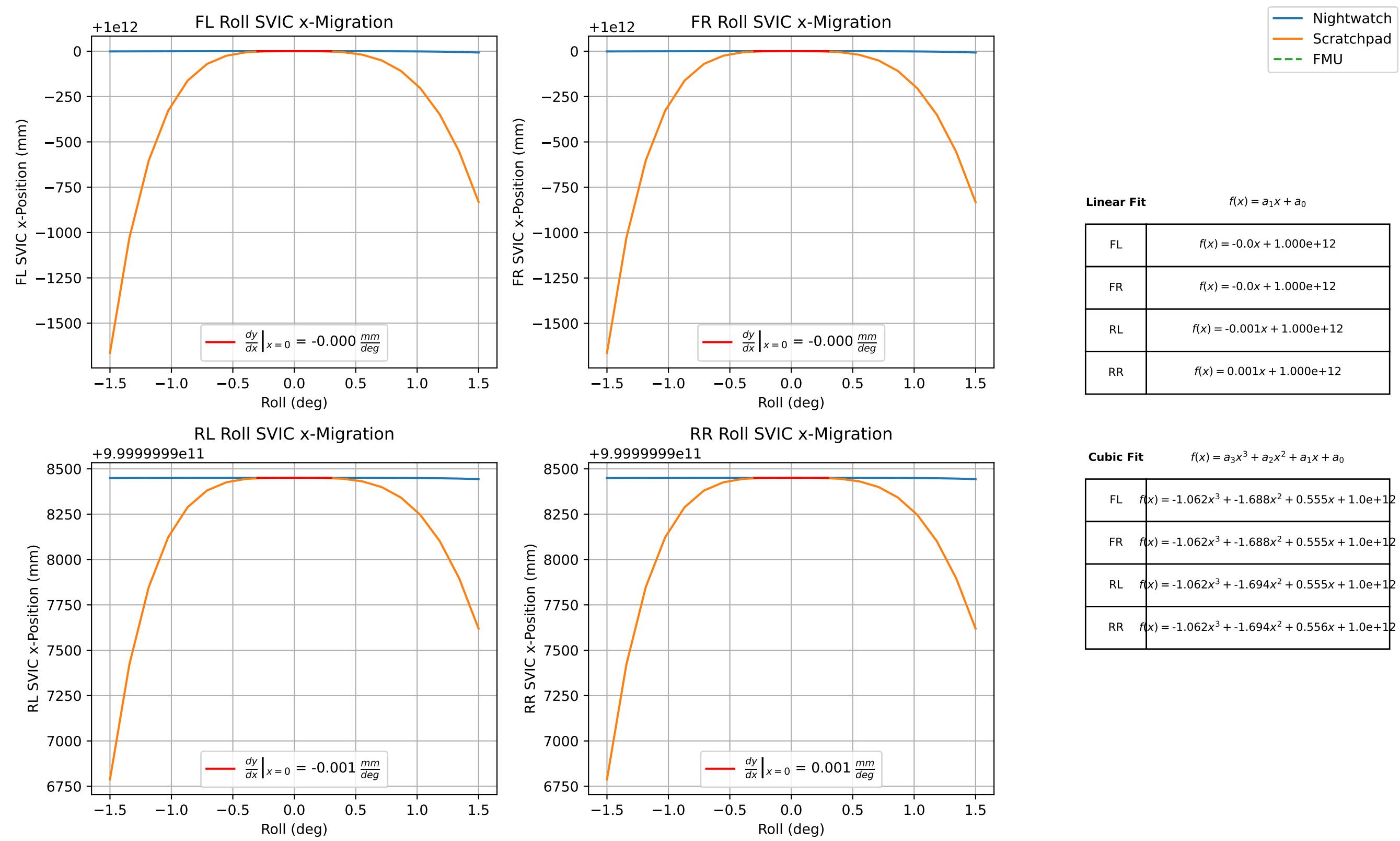


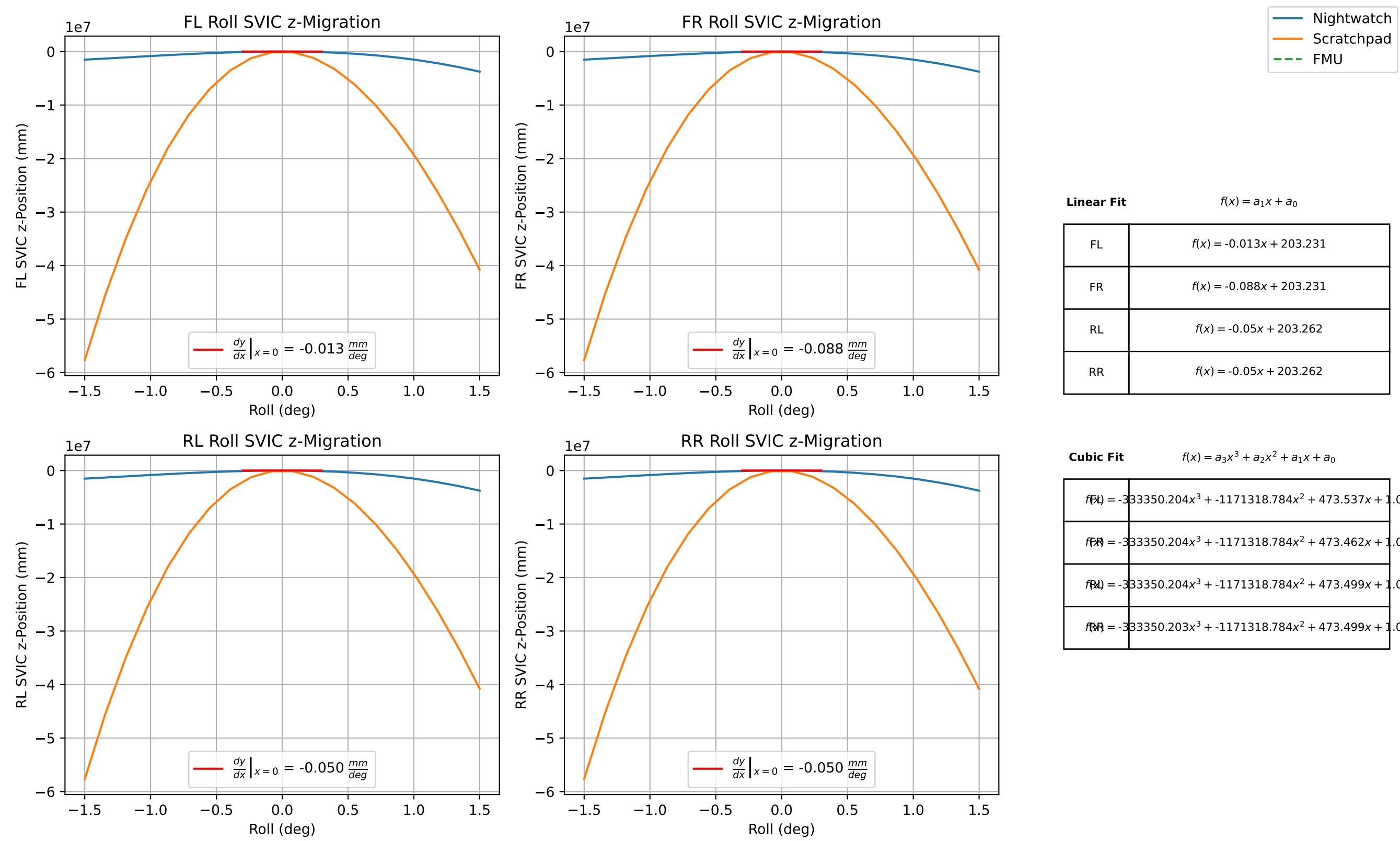
RR Roll FVIC z-Migration

**Cubic Fit**

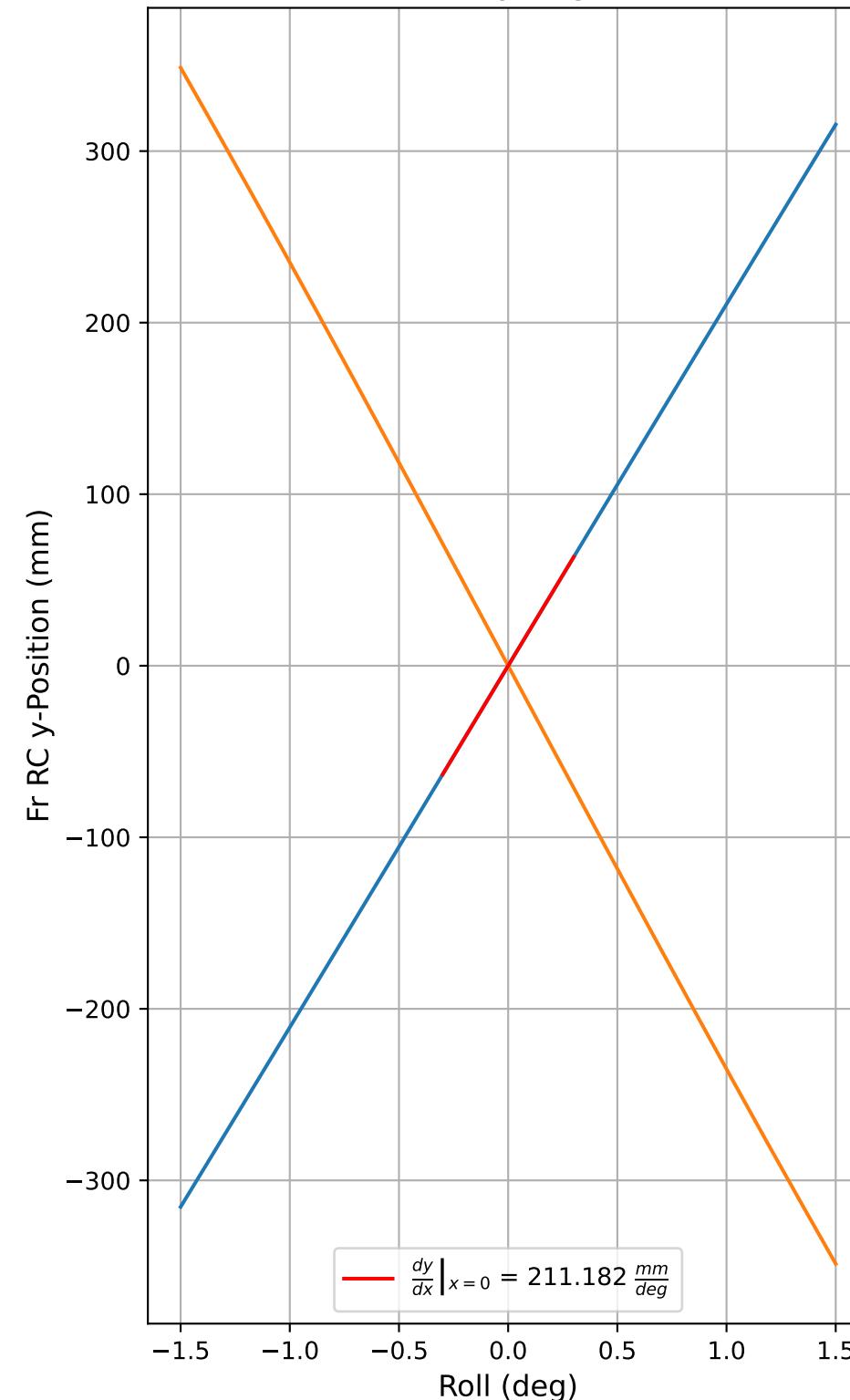
$$f(x) = a_3x^3 + a_2x^2 + a_1x + a_0$$

FL	$f(x) = -0.002x^3 + 0.178x^2 + 9.87x + 27.34$
FR	$f(x) = 0.002x^3 + 0.178x^2 - 9.87x + 27.34$
RL	$f(x) = -0.006x^3 + 0.296x^2 + 15.566x + 37.239$
RR	$f(x) = 0.007x^3 + 0.296x^2 - 15.566x + 37.239$

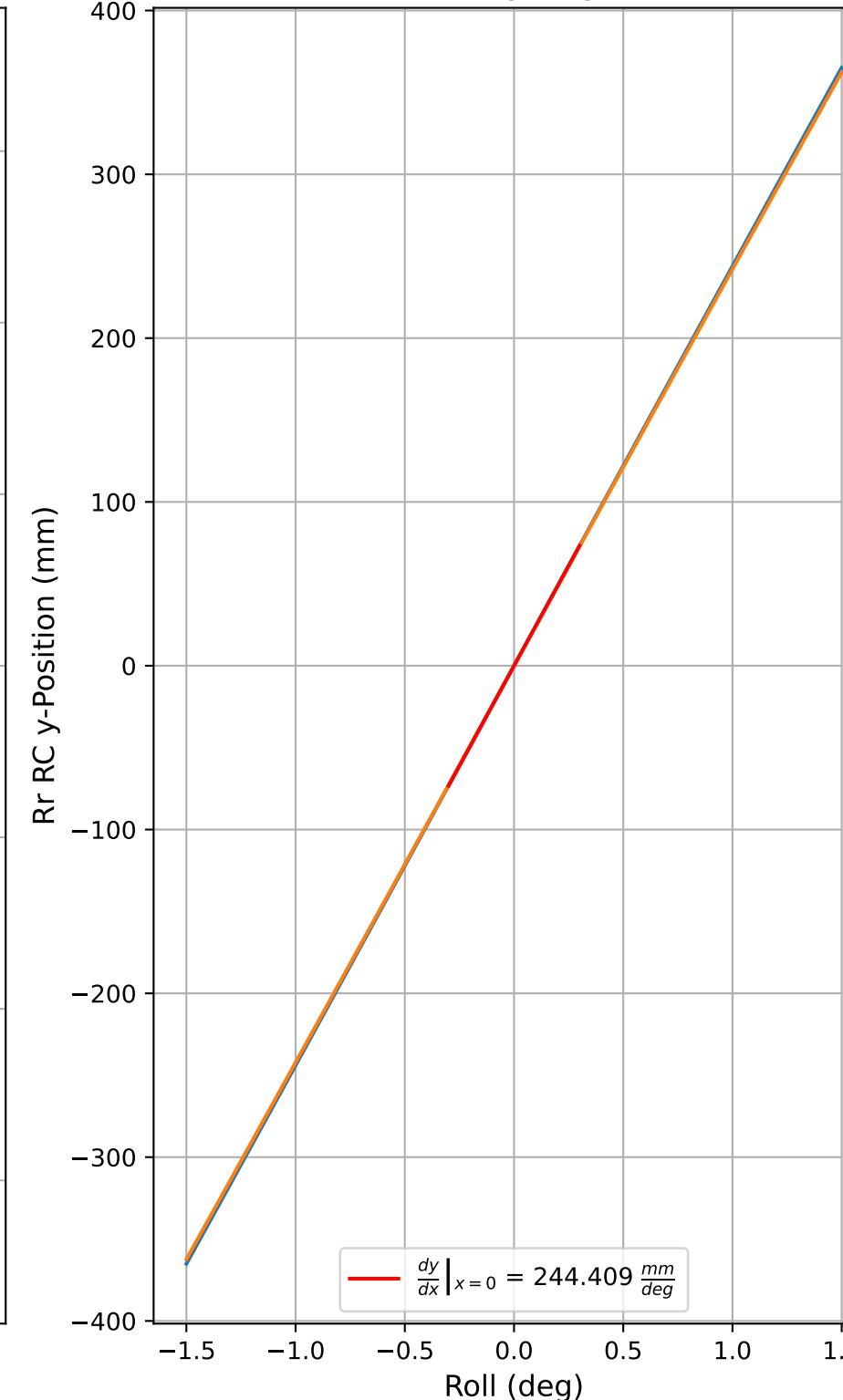




Fr Roll RC y-Migration



Rr Roll RC y-Migration



Linear Fit

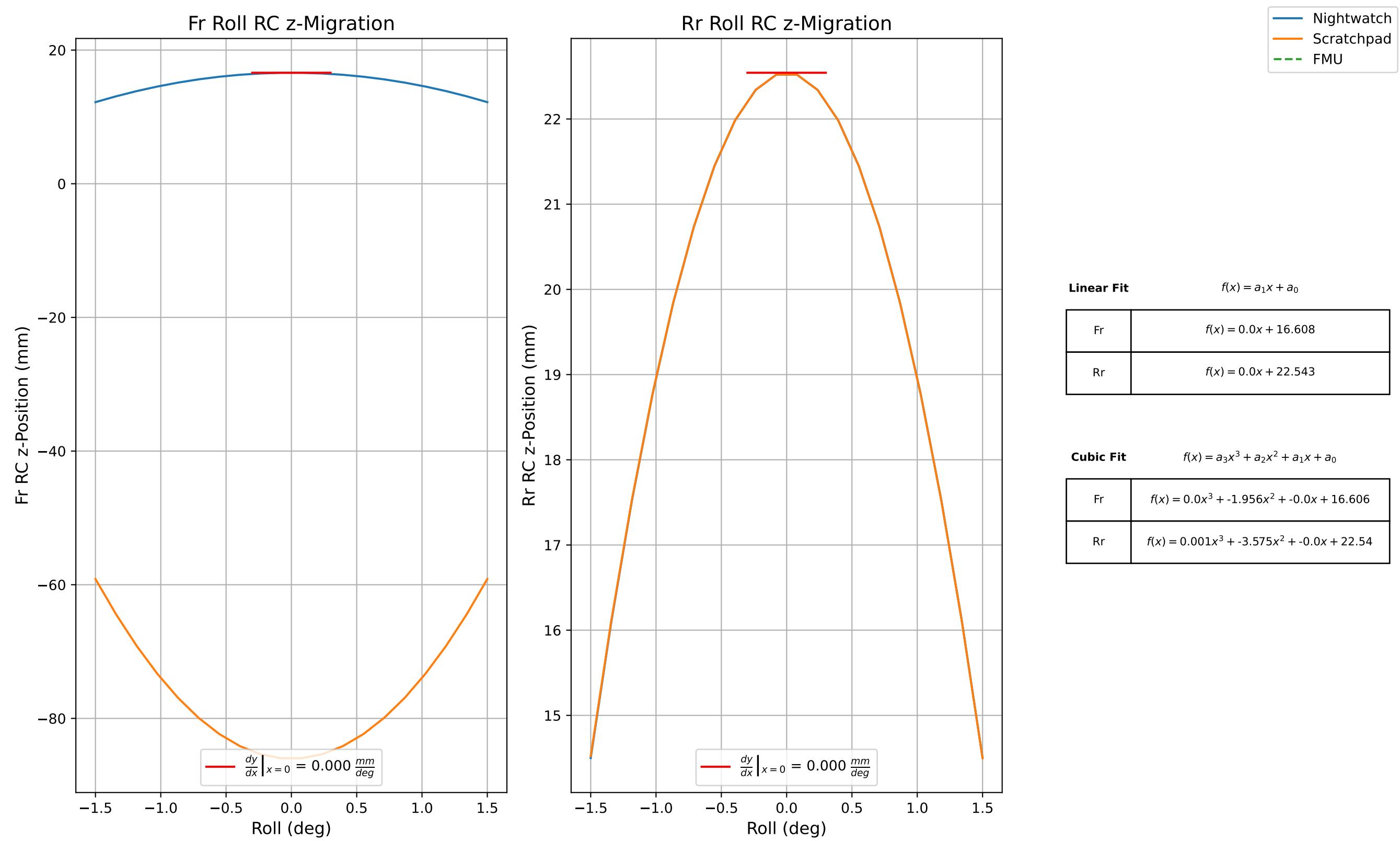
$$f(x) = a_1x + a_0$$

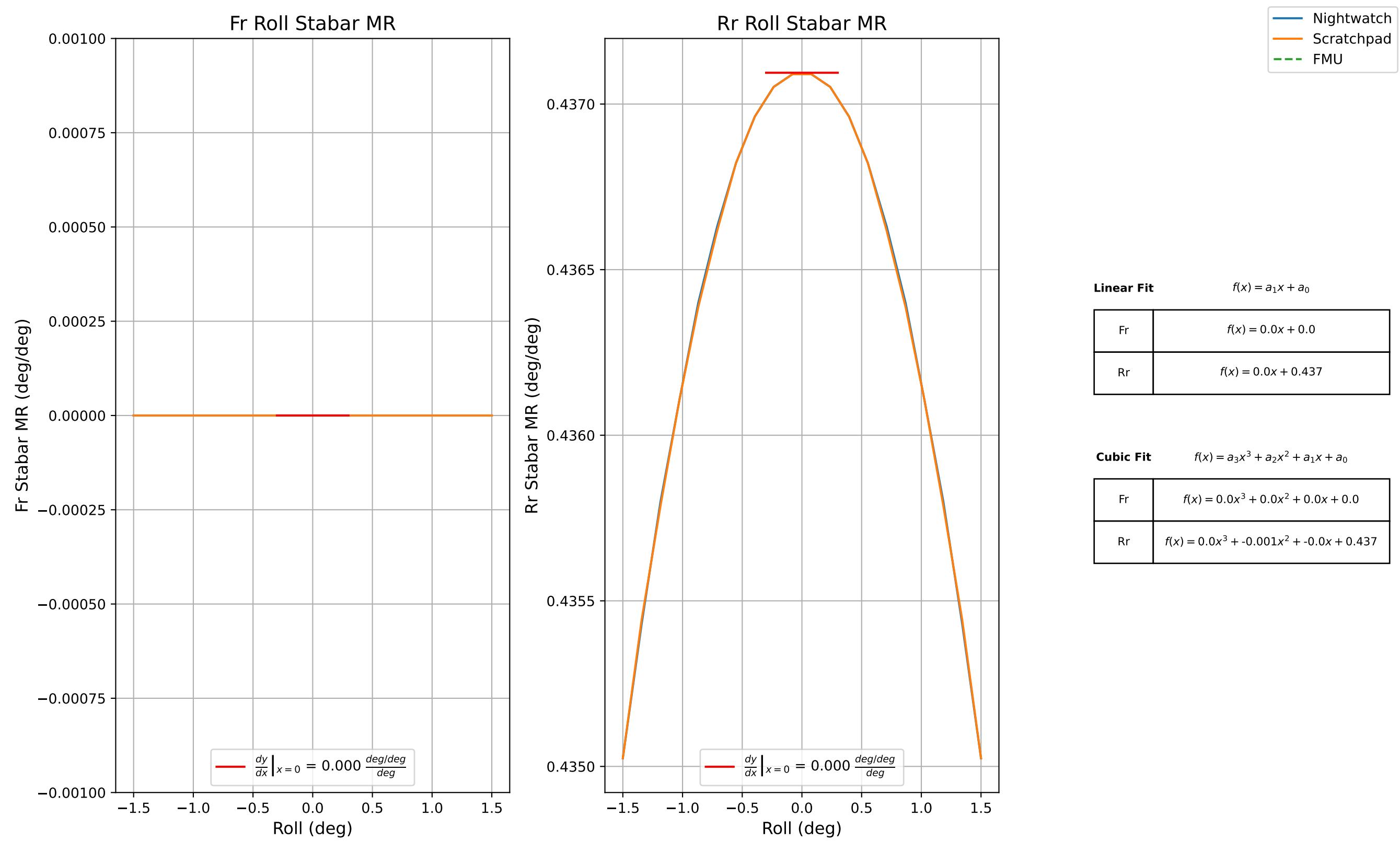
Fr	$f(x) = 211.182x + -0.0$
Rr	$f(x) = 244.409x + 0.0$

Cubic Fit

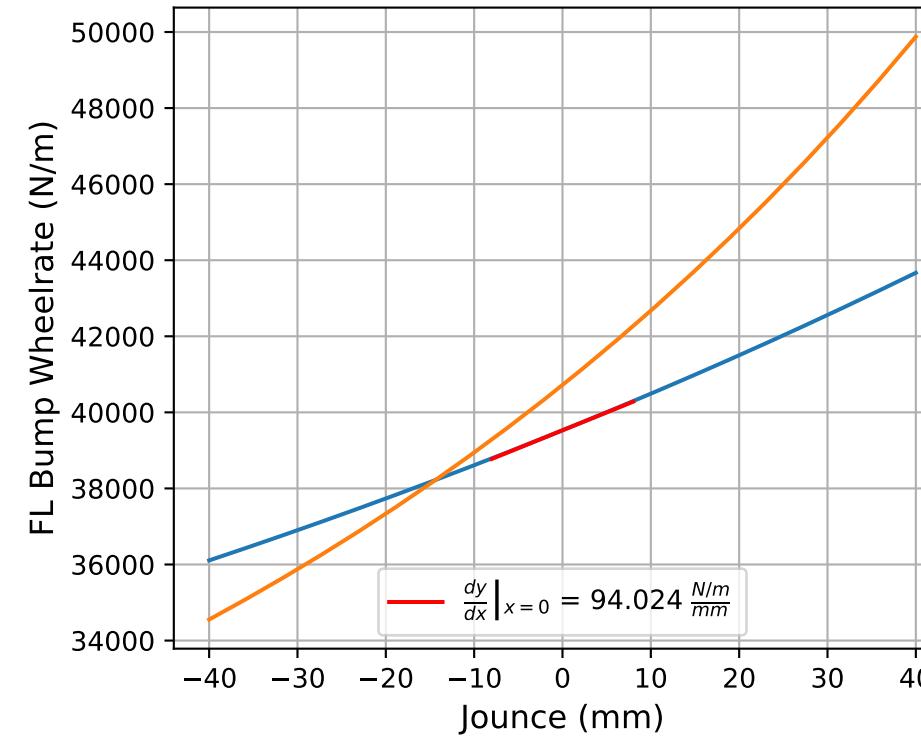
$$f(x) = a_3x^3 + a_2x^2 + a_1x + a_0$$

Fr	$f(x) = -0.387x^3 + -0.0x^2 + 211.182x + 0.0$
Rr	$f(x) = -0.442x^3 + -0.0x^2 + 244.409x + 0.0$

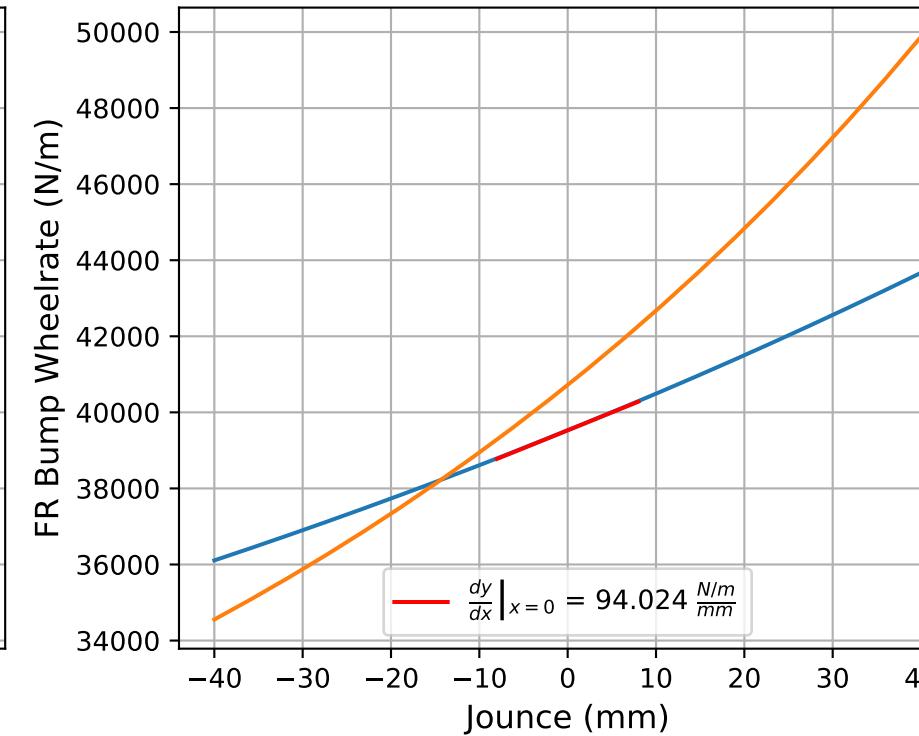




FL Bump Wheelrate



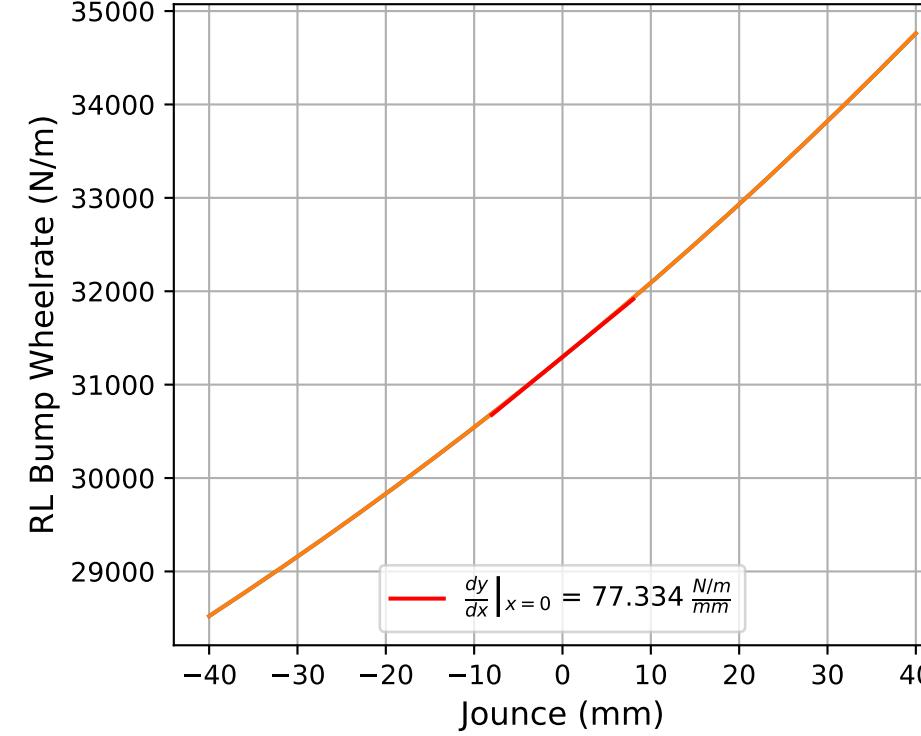
FR Bump Wheelrate

**Linear Fit**

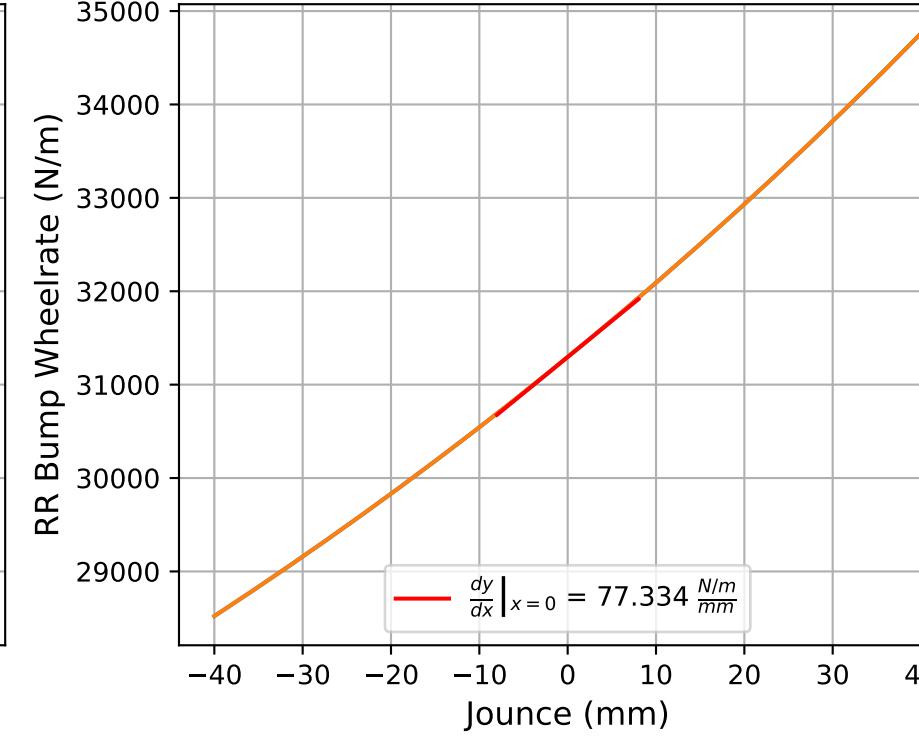
$$f(x) = a_1x + a_0$$

FL	$f(x) = 94.024x + 3.953e+04$
FR	$f(x) = 94.024x + 3.953e+04$
RL	$f(x) = 77.334x + 3.130e+04$
RR	$f(x) = 77.334x + 3.130e+04$

RL Bump Wheelrate



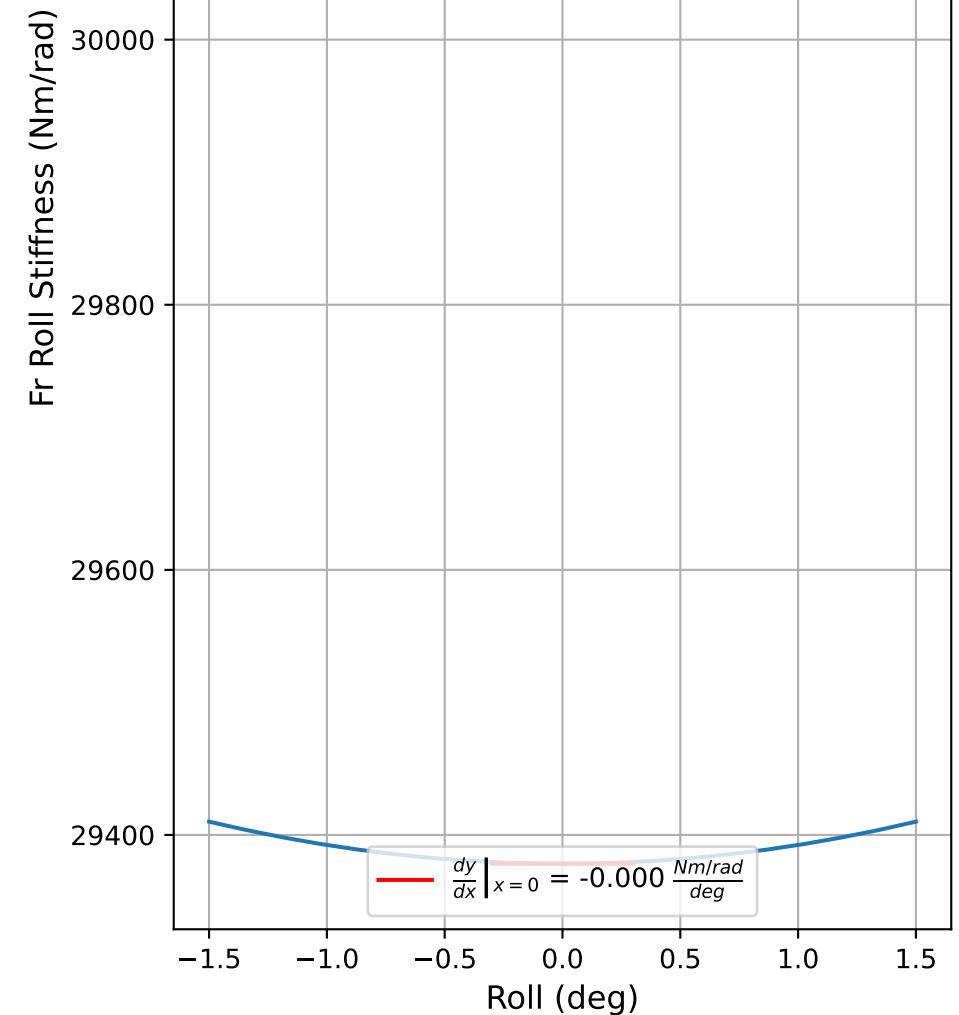
RR Bump Wheelrate

**Cubic Fit**

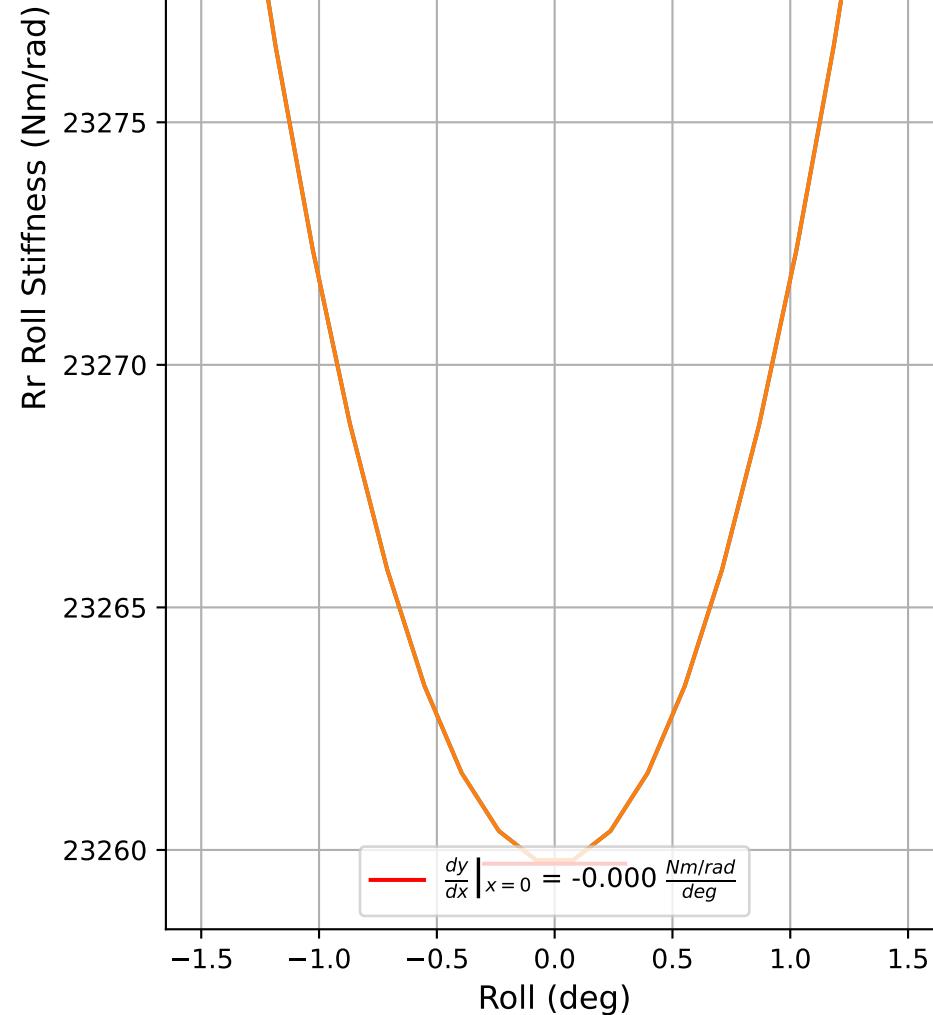
$$f(x) = a_3x^3 + a_2x^2 + a_1x + a_0$$

FL	$f(x) = 0.0x^3 + 0.225x^2 + 94.027x + 4.0e+04$
FR	$f(x) = 0.0x^3 + 0.225x^2 + 94.027x + 4.0e+04$
RL	$f(x) = 0.0x^3 + 0.216x^2 + 77.334x + 3.1e+04$
RR	$f(x) = 0.0x^3 + 0.216x^2 + 77.334x + 3.1e+04$

Fr Roll Stiffness



Rr Roll Stiffness



Nightwatch	Blue line
Scratchpad	Orange line
FMU	Dashed green line

Linear Fit

$$f(x) = a_1x + a_0$$

Fr	$f(x) = -0.0x + 29378.323$
Rr	$f(x) = -0.0x + 23259.717$

Cubic Fit

$$f(x) = a_3x^3 + a_2x^2 + a_1x + a_0$$

Fr	$f(x) = -0.0x^3 + 14.096x^2 + 0.0x + 29378.323$
Rr	$f(x) = 0.0x^3 + 12.015x^2 + -0.0x + 23259.715$