



Kinematics Report

Simulation Author: Robert Horvath

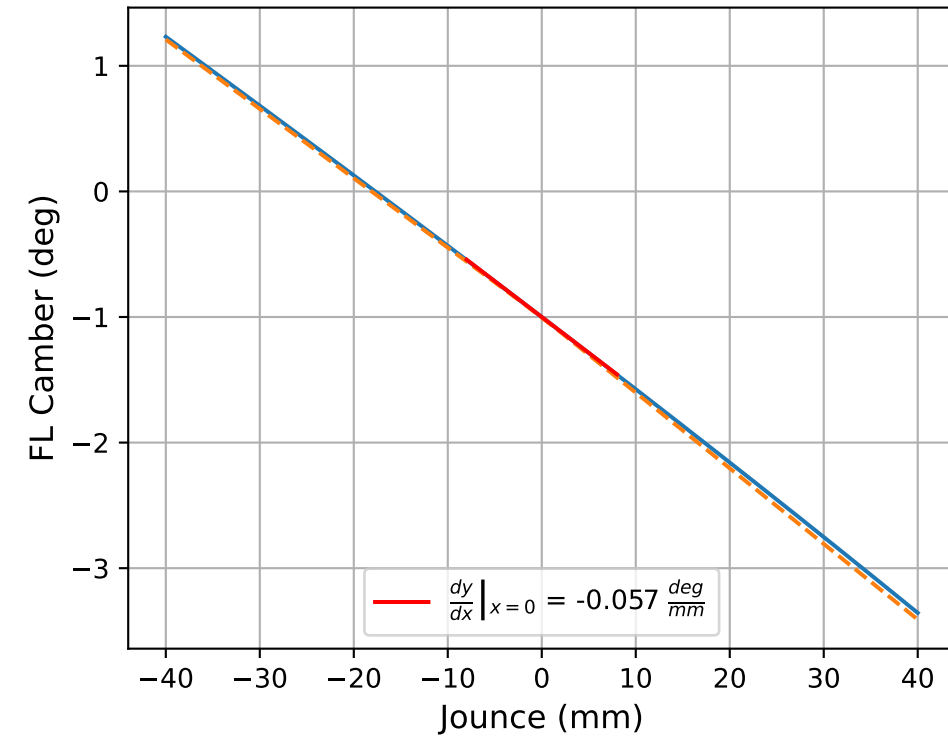
Generated By: Robert (roberthorvath5@gmail.com)

Date: 2025-06-15, 10:31 PM PDT

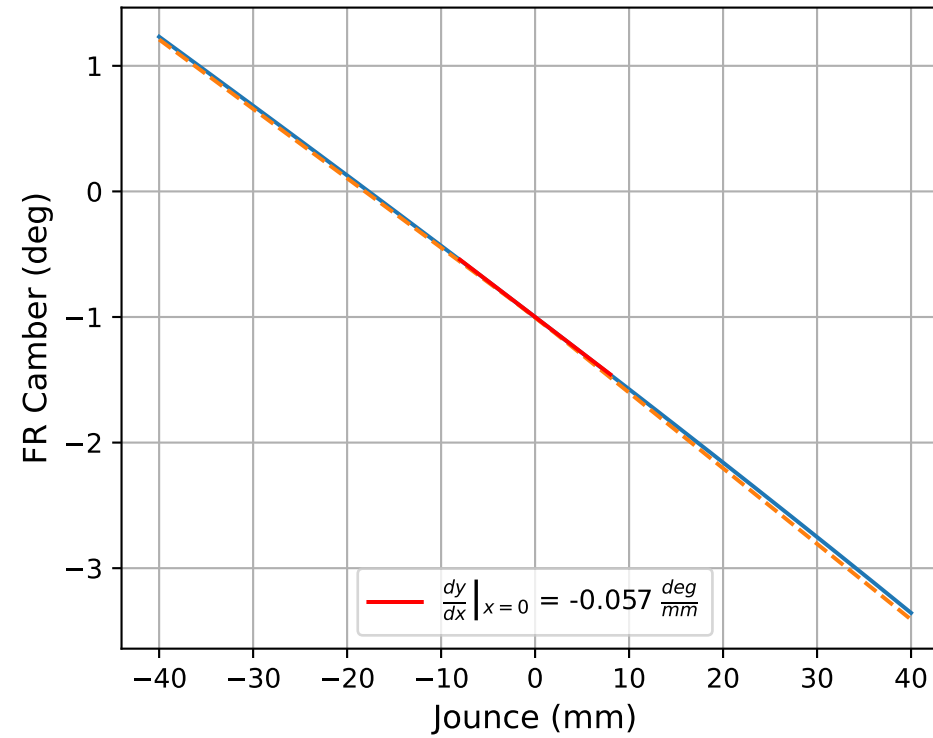
Note 1: Linear fits are tangent lines about $x = 0$ (NOT fits over the entire range)

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

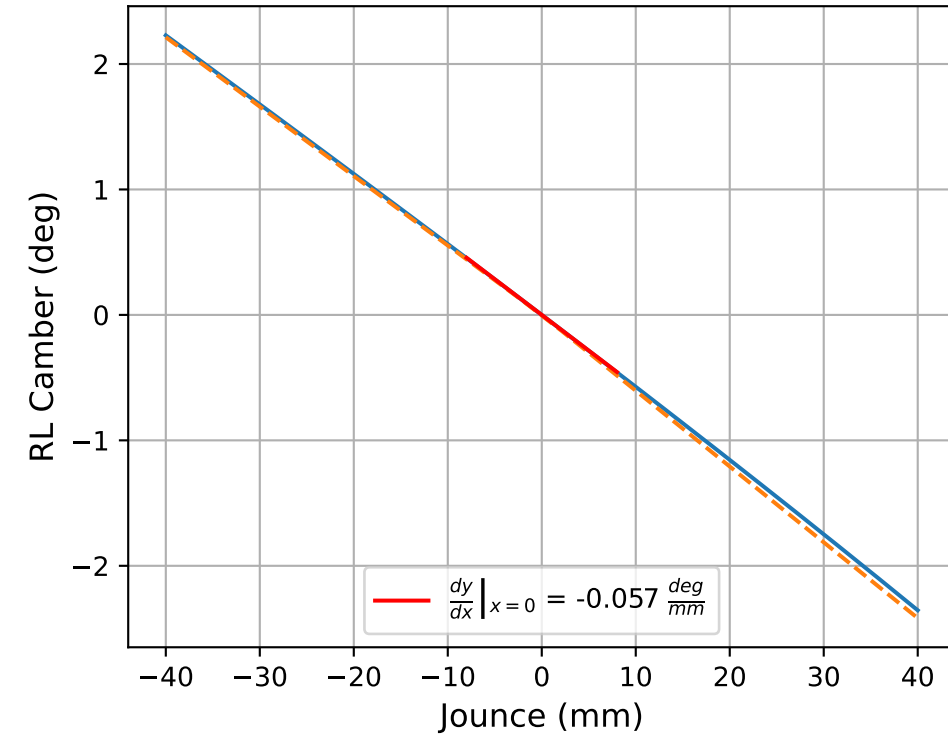
FL Bump Camber



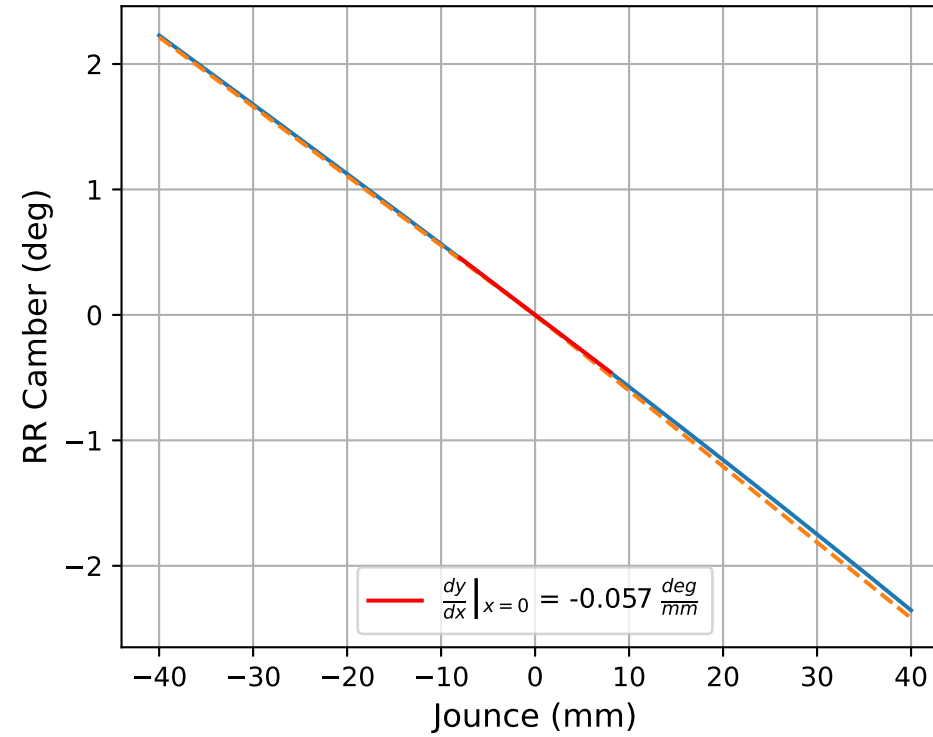
FR Bump Camber



RL Bump Camber



RR Bump Camber



Full Model
FMU

Linear Fit

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

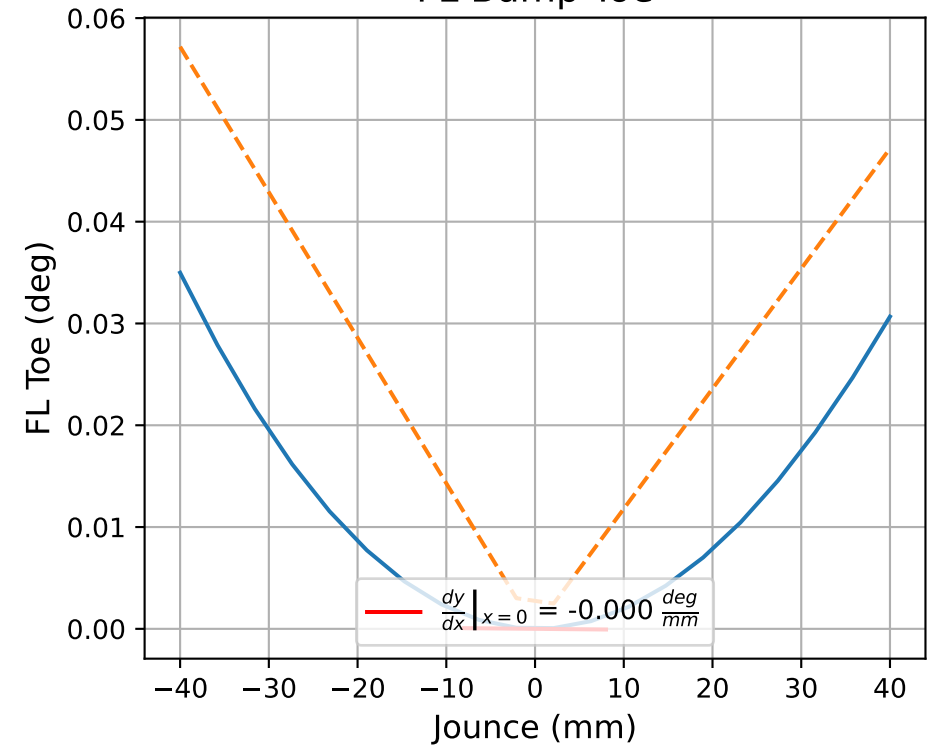
FL	$f(x) = -0.057x + -1.0$
FR	$f(x) = -0.057x + -1.0$
RL	$f(x) = -0.057x + 0.0$
RR	$f(x) = -0.057x + 0.0$

Cubic Fit

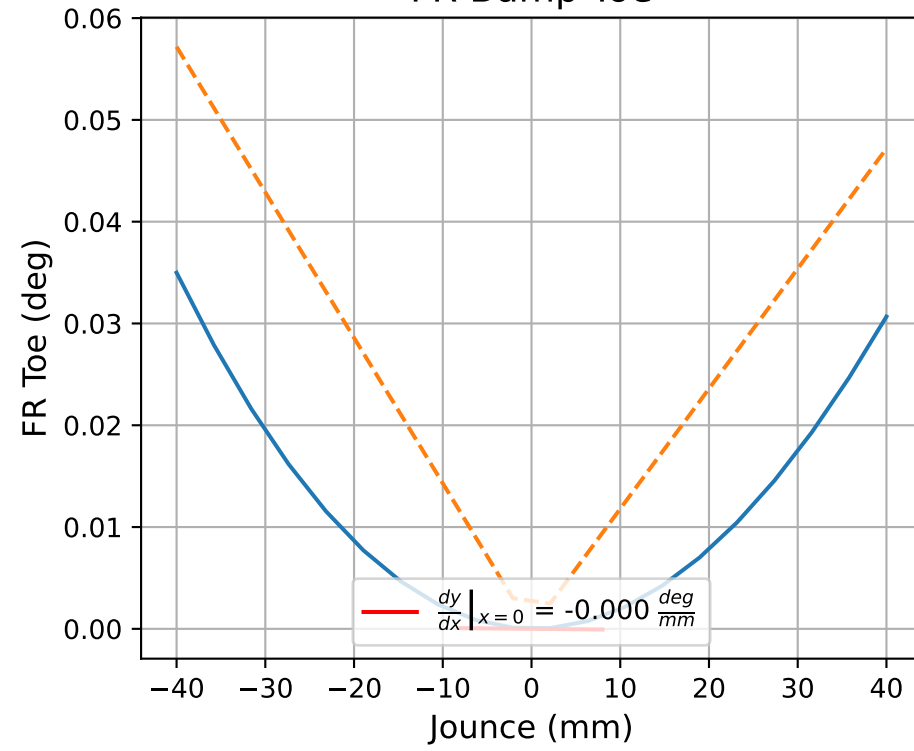
$$f(x) = a_3x^3 + a_2x^2 + a_1x + a_0$$

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	$f(x) = -0.0x^3 + -0.0x^2 + -0.057x + 0.0$

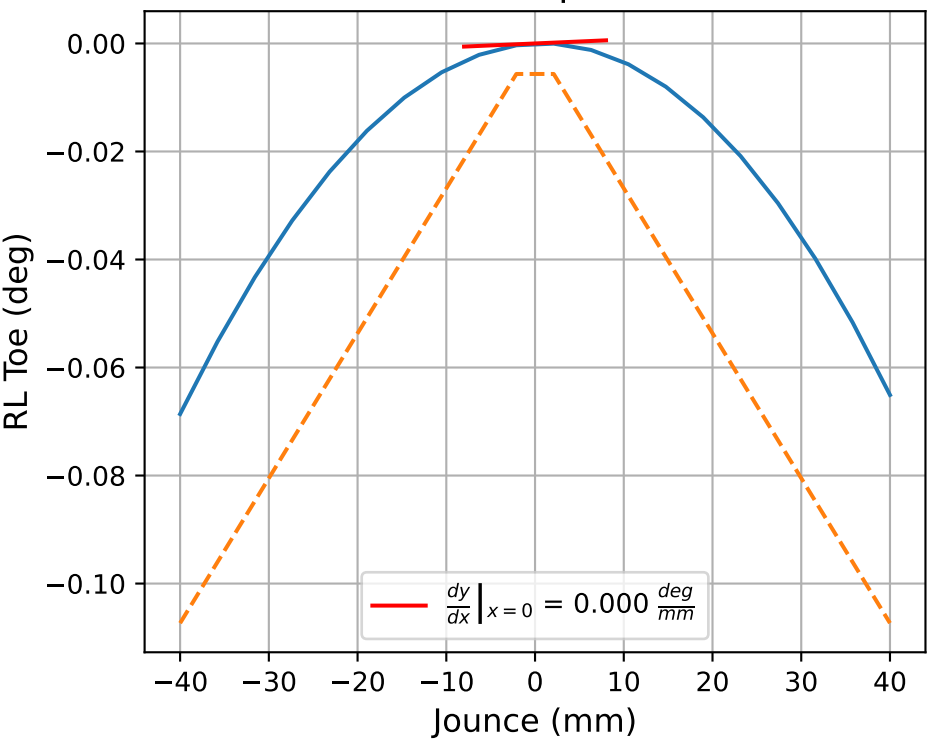
FL Bump Toe



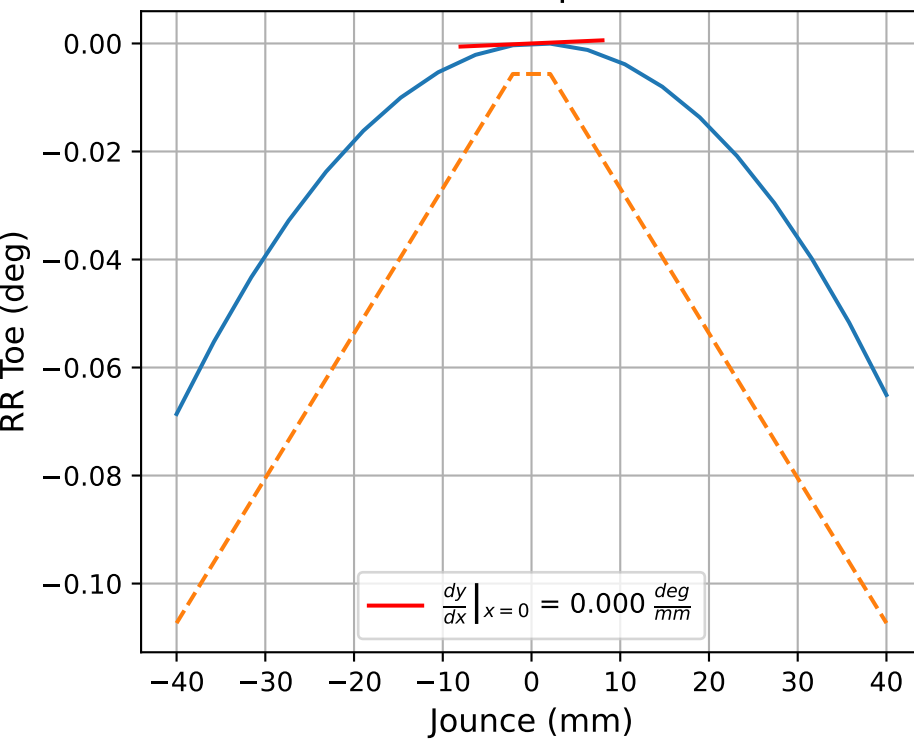
FR Bump Toe



RL Bump Toe



RR Bump Toe



Linear Fit

$f(x) = a_1x + a_0$

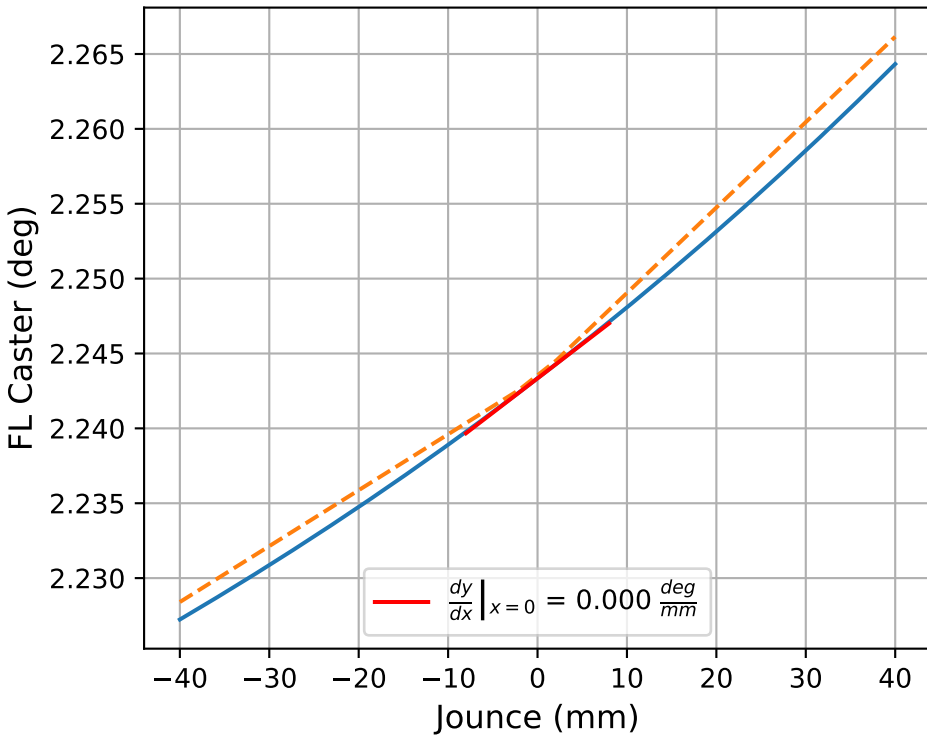
FL	$f(x) = -0.0x + -0.0$
FR	$f(x) = -0.0x + -0.0$
RL	$f(x) = 0.0x + 0.0$
RR	$f(x) = 0.0x + 0.0$

Cubic Fit

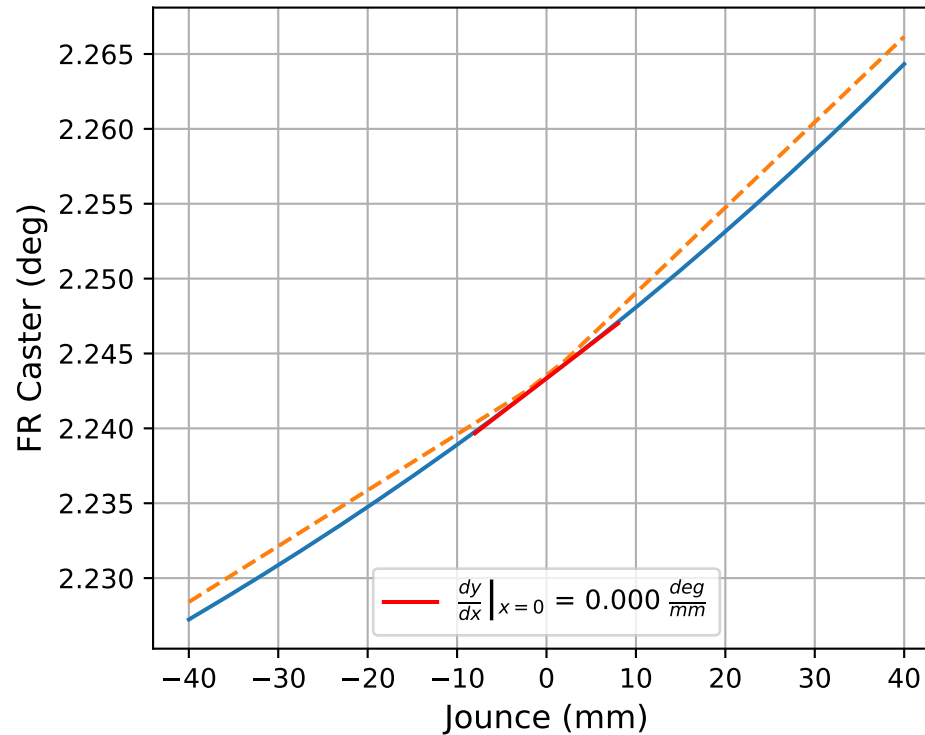
$f(x) = a_3x^3 + a_2x^2 + a_1x + a_0$

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

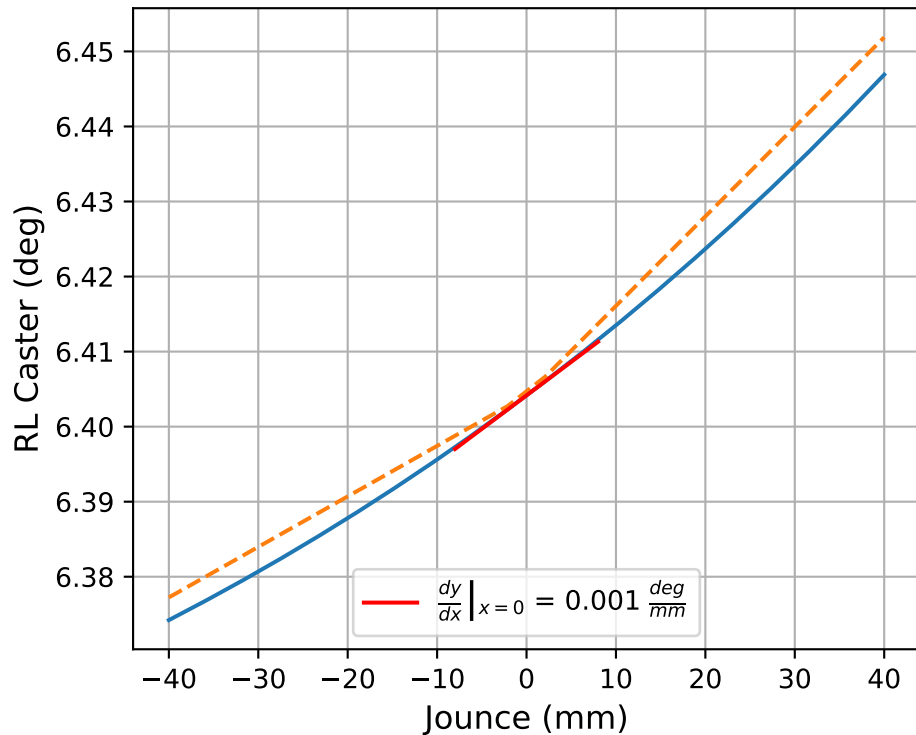
FL Bump Caster



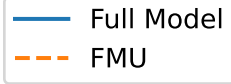
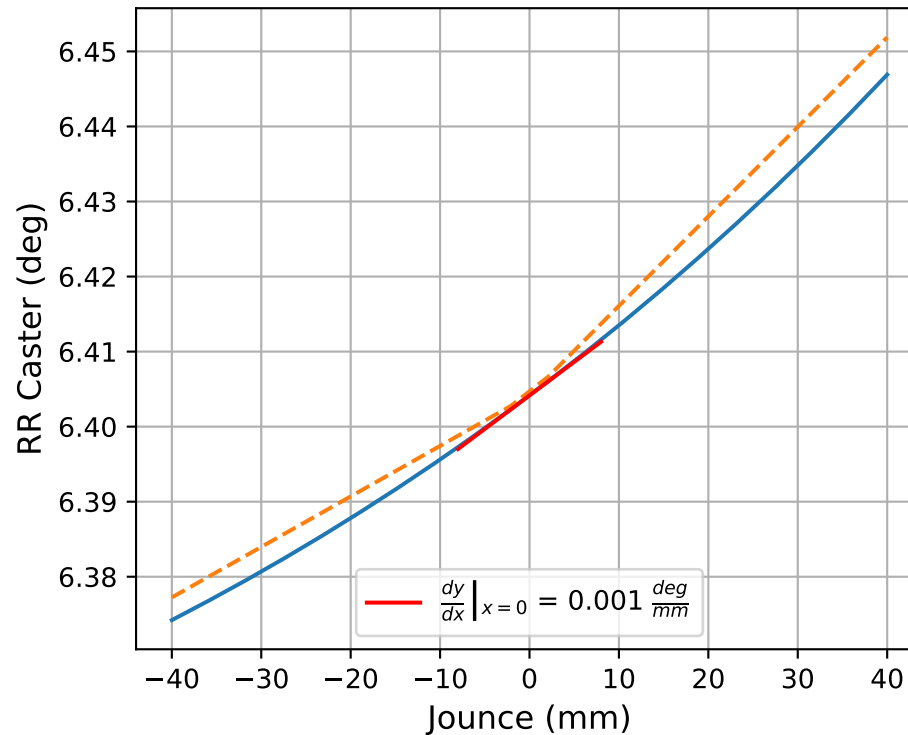
FR Bump Caster



RL Bump Caster



RR 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	$f(x) = 0.001x + 6.404$

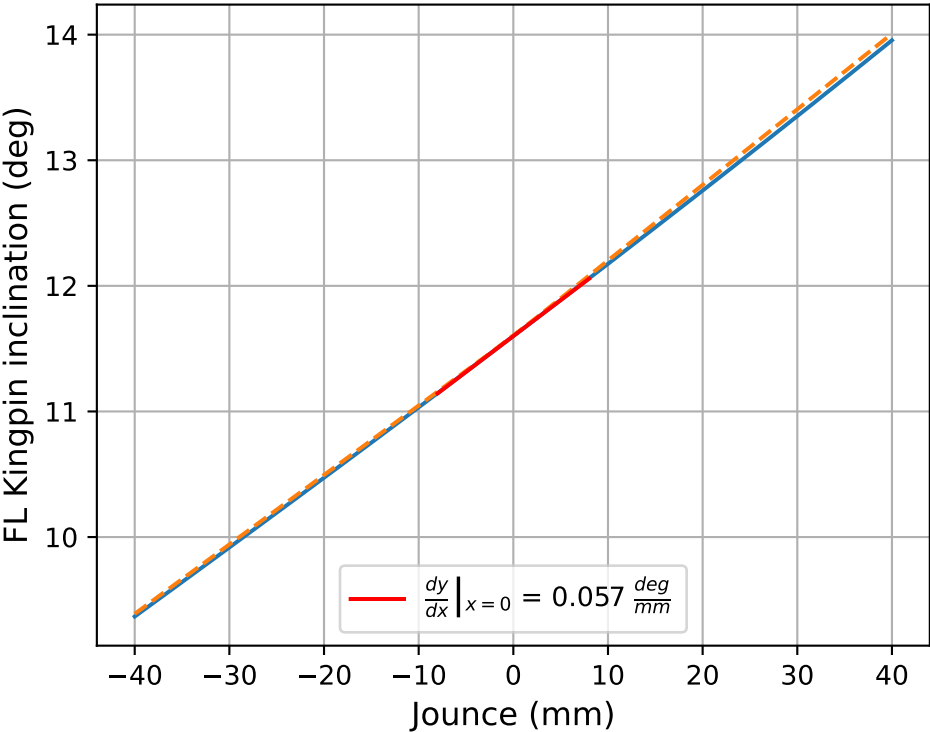
Cubic Fit

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

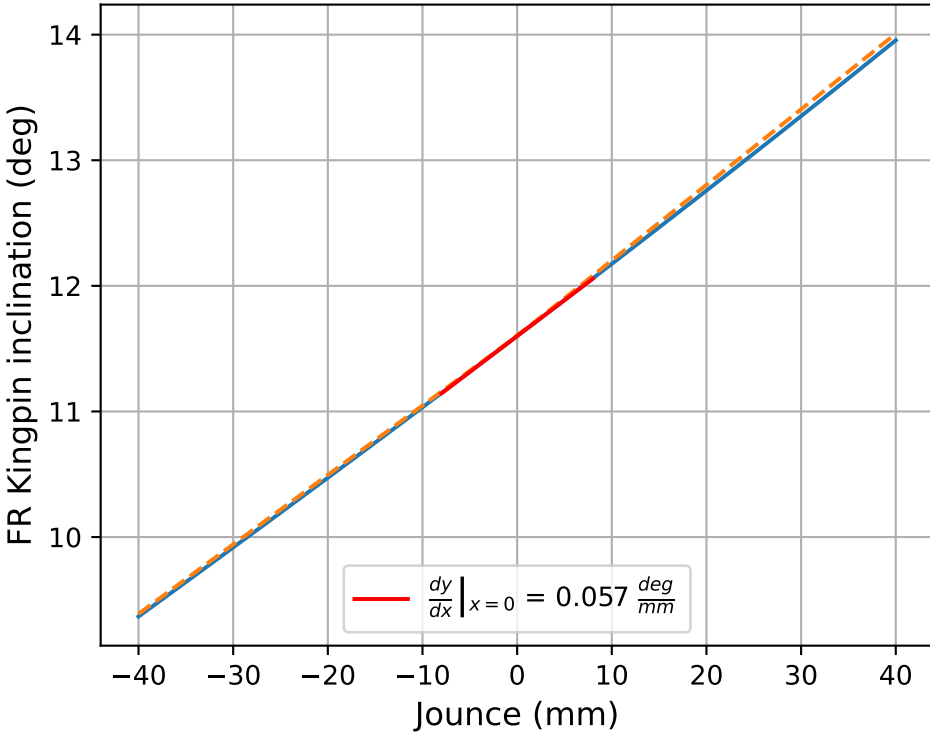
FL	$f(x) = 0.0x^3 + 0.0x^2 + 0.0x + 2.243$
FR	$f(x) = 0.0x^3 + 0.0x^2 + 0.0x + 2.243$
RL	$f(x) = 0.0x^3 + 0.0x^2 + 0.001x + 6.404$
RR	$f(x) = 0.0x^3 + 0.0x^2 + 0.001x + 6.404$



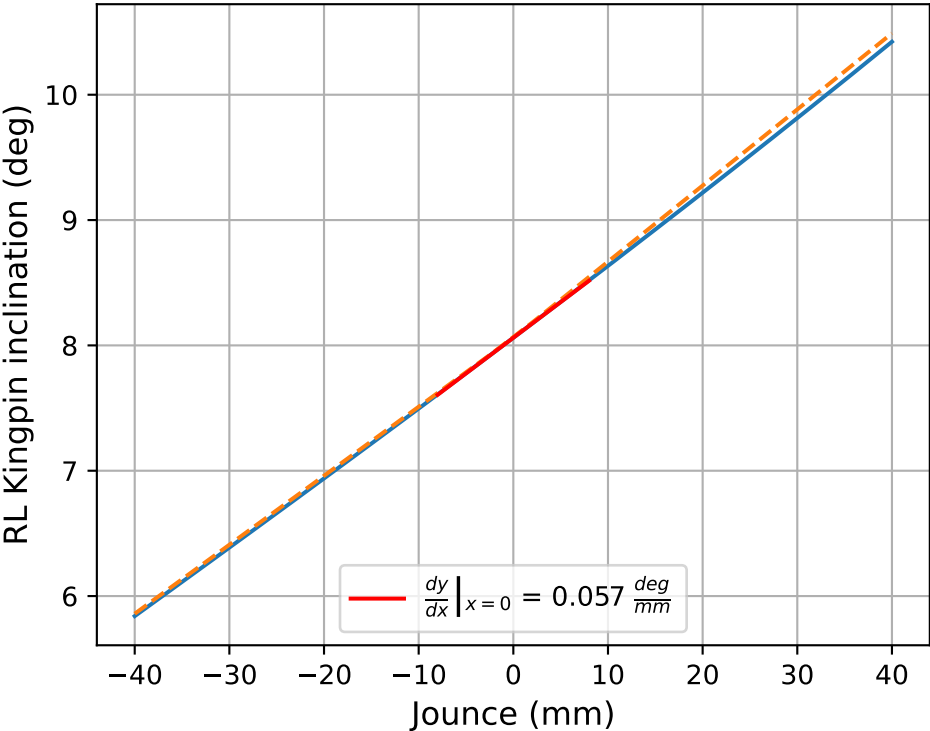
FL Bump KPI



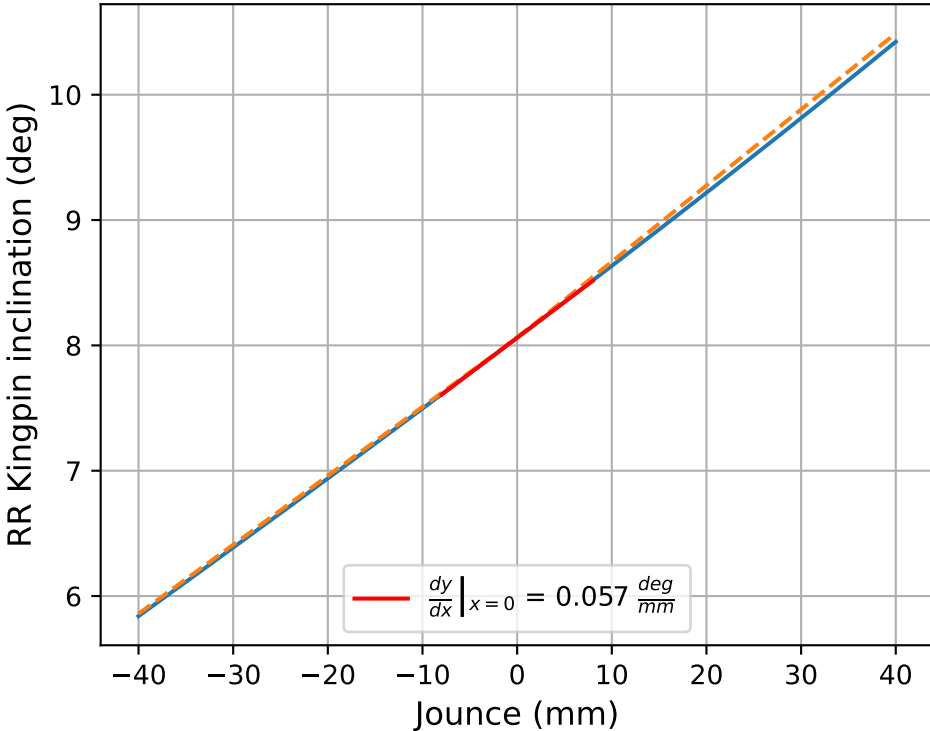
FR Bump KPI



RL Bump KPI



RR Bump KPI



Linear Fit

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

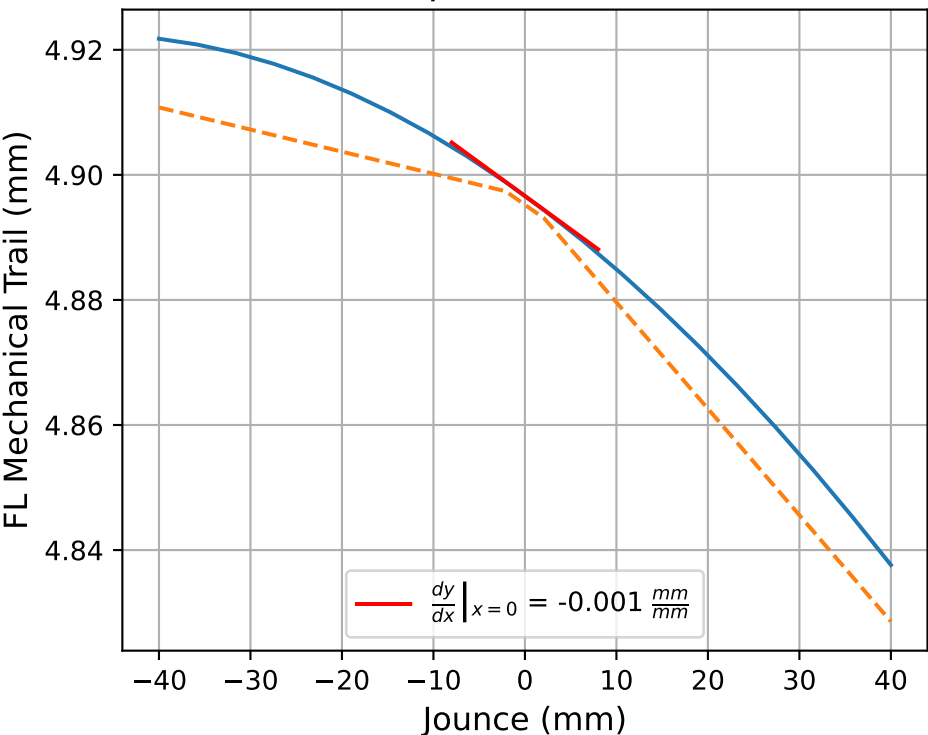
FL	$f(x) = 0.057x + 11.6$
FR	$f(x) = 0.057x + 11.6$
RL	$f(x) = 0.057x + 8.061$
RR	$f(x) = 0.057x + 8.061$

Cubic Fit

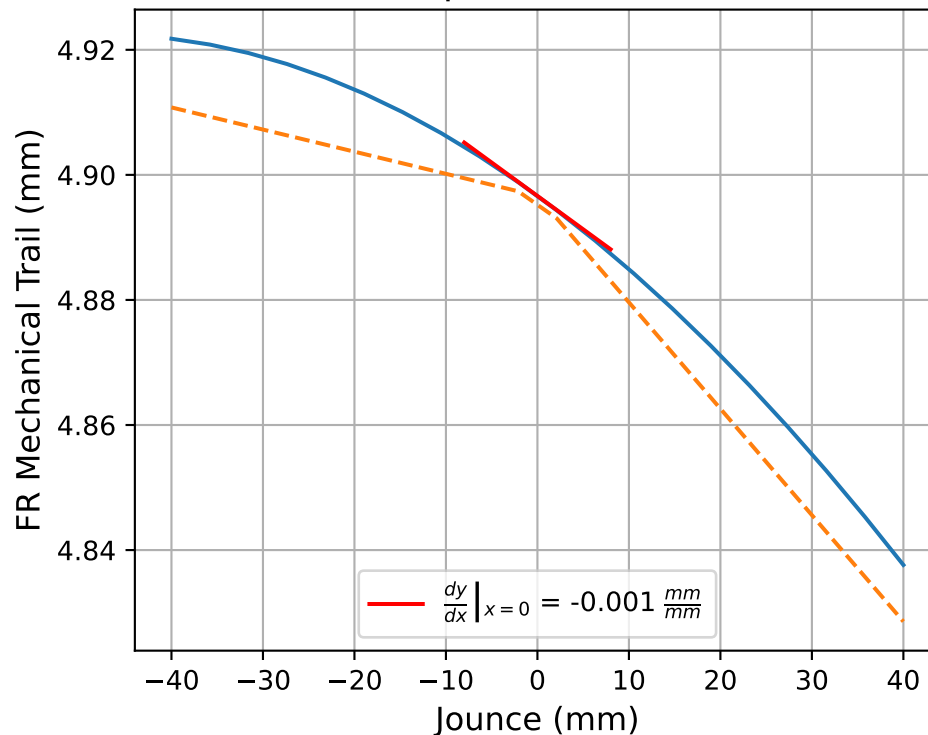
$$f(x) = a_3x^3 + a_2x^2 + a_1x + a_0$$

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

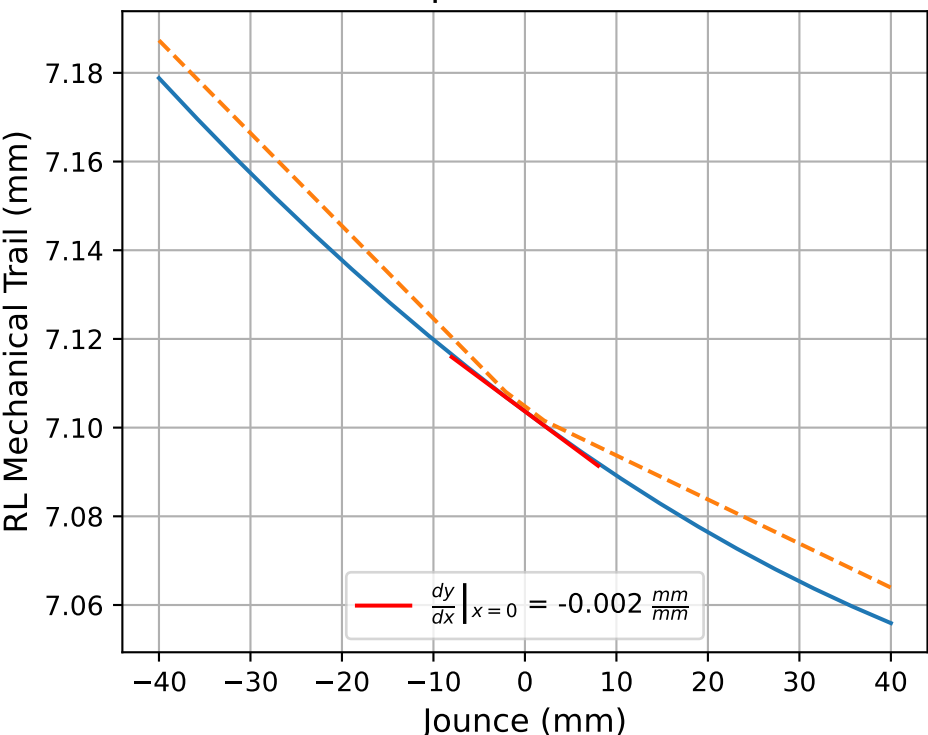
FL Bump Mechanical Trail



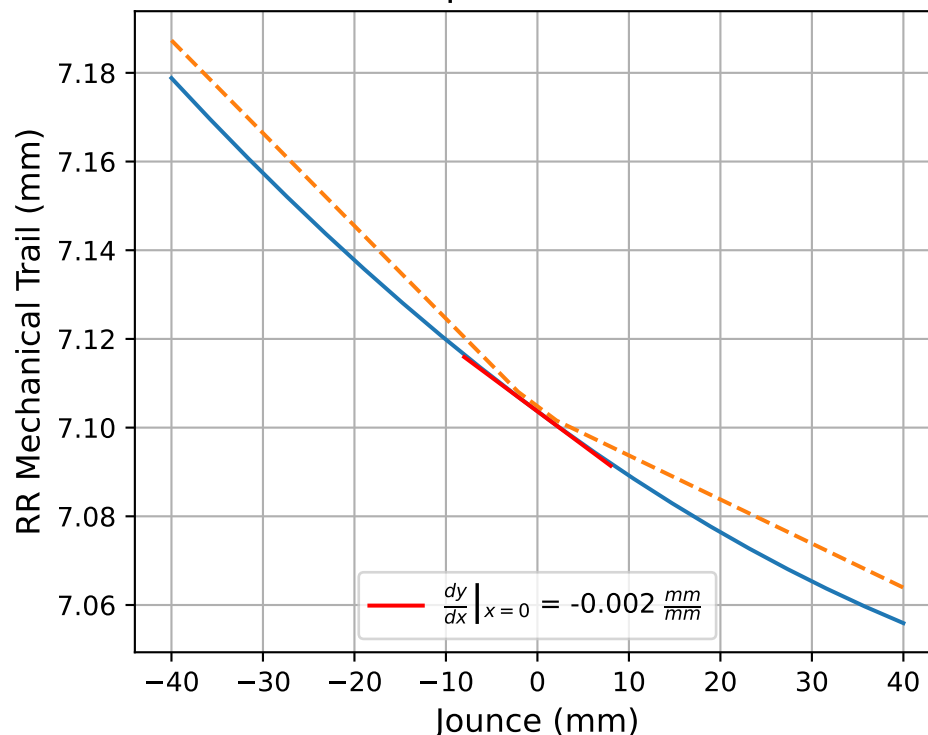
FR Bump Mechanical Trail



RL Bump Mechanical Trail



RR Bump Mechanical Trail



Linear Fit

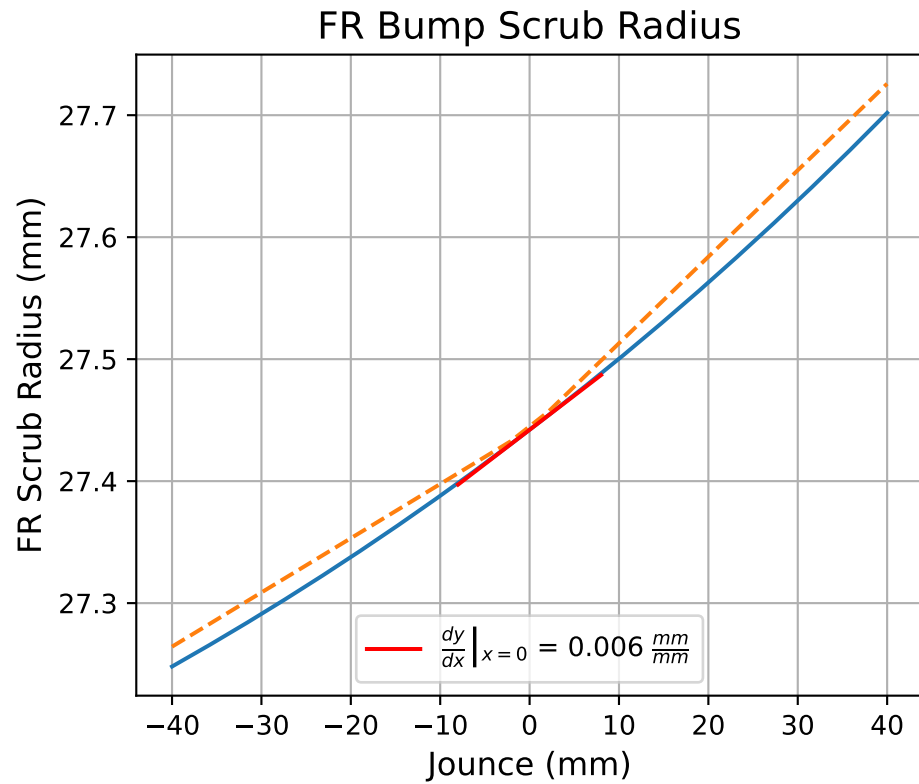
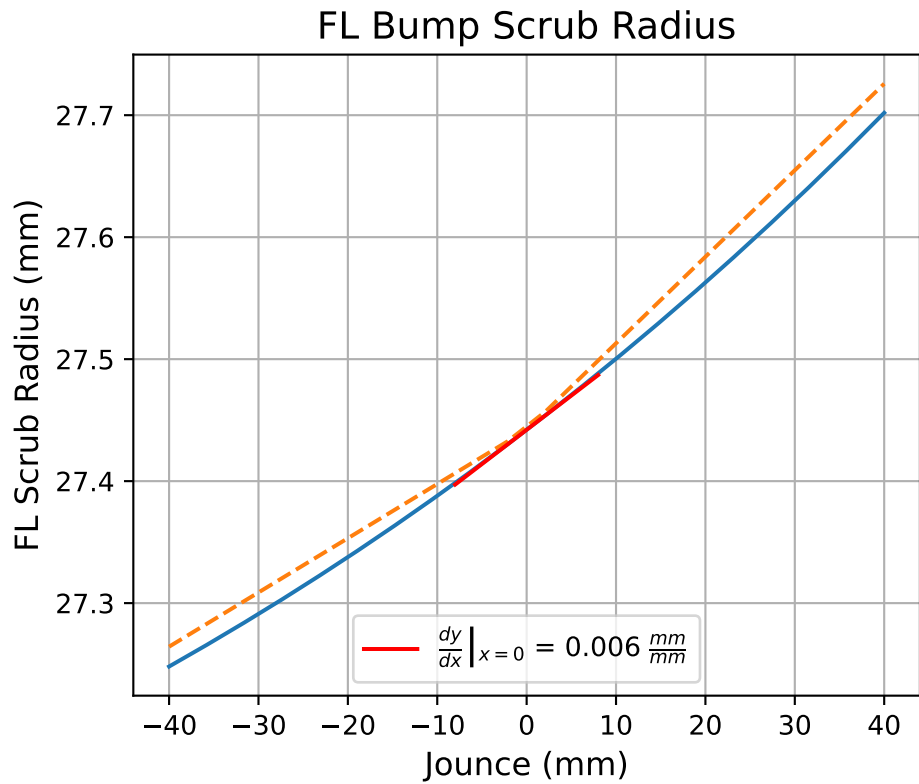
$$f(x) = a_1x + a_0$$

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

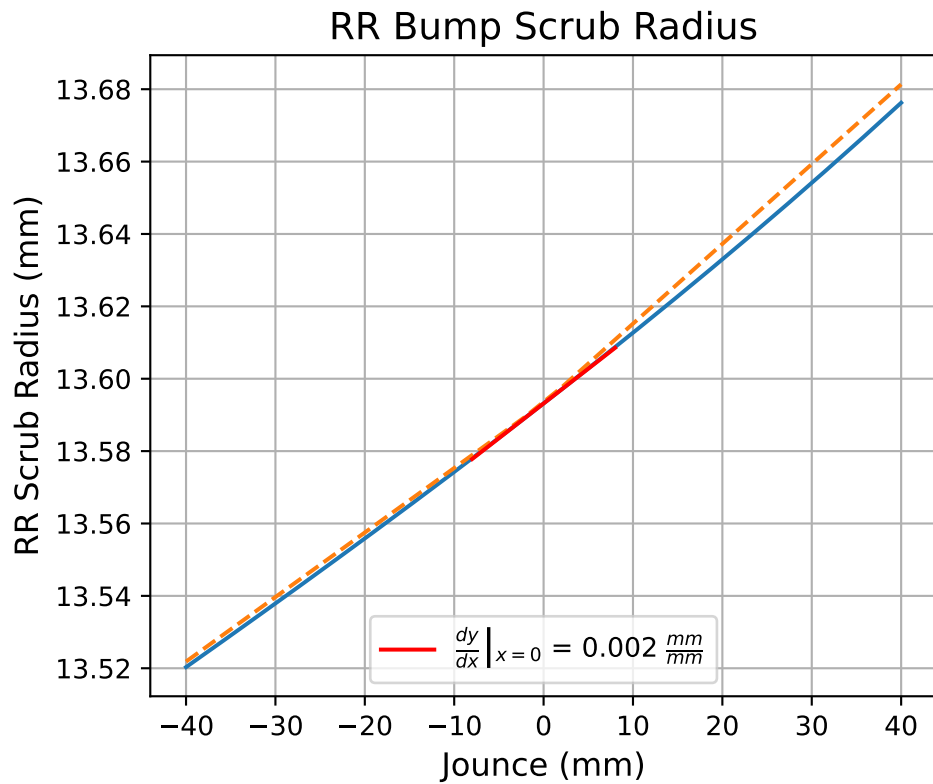
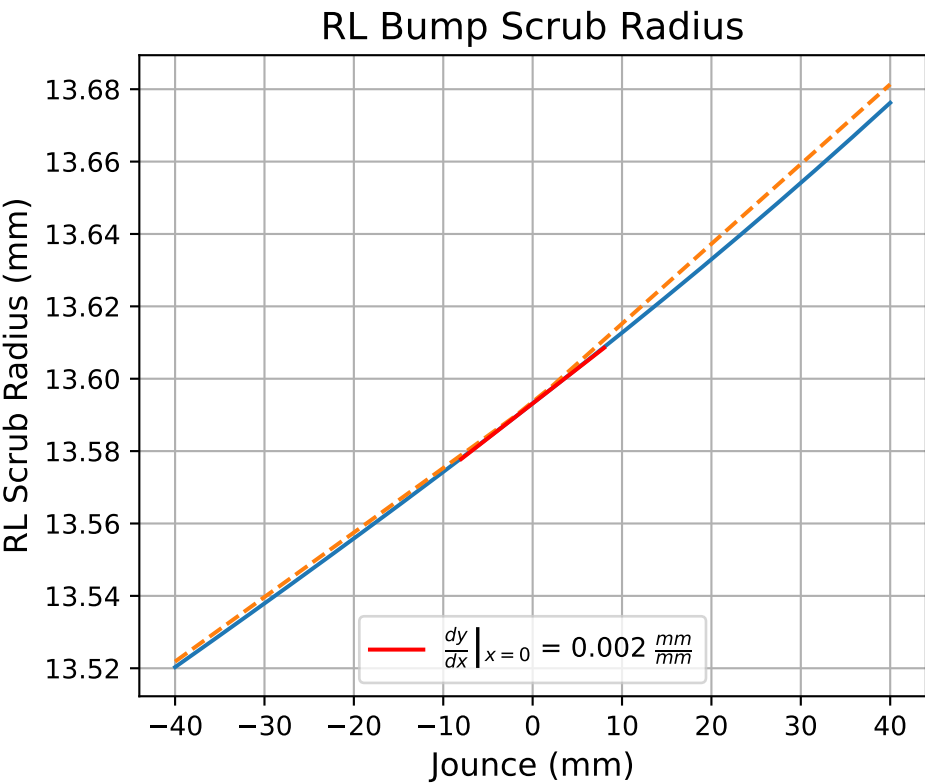
Cubic Fit

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

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

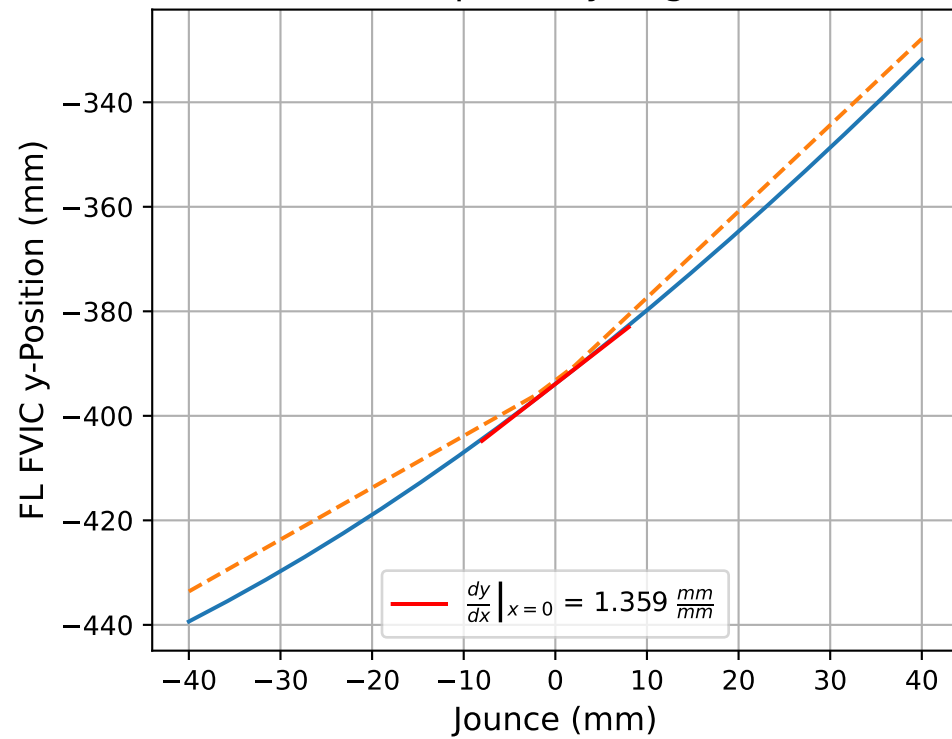


Linear Fit		$f(x) = a_1x + a_0$
FL		$f(x) = 0.006x + 27.442$
FR		$f(x) = 0.006x + 27.442$
RL		$f(x) = 0.002x + 13.593$
RR		$f(x) = 0.002x + 13.593$

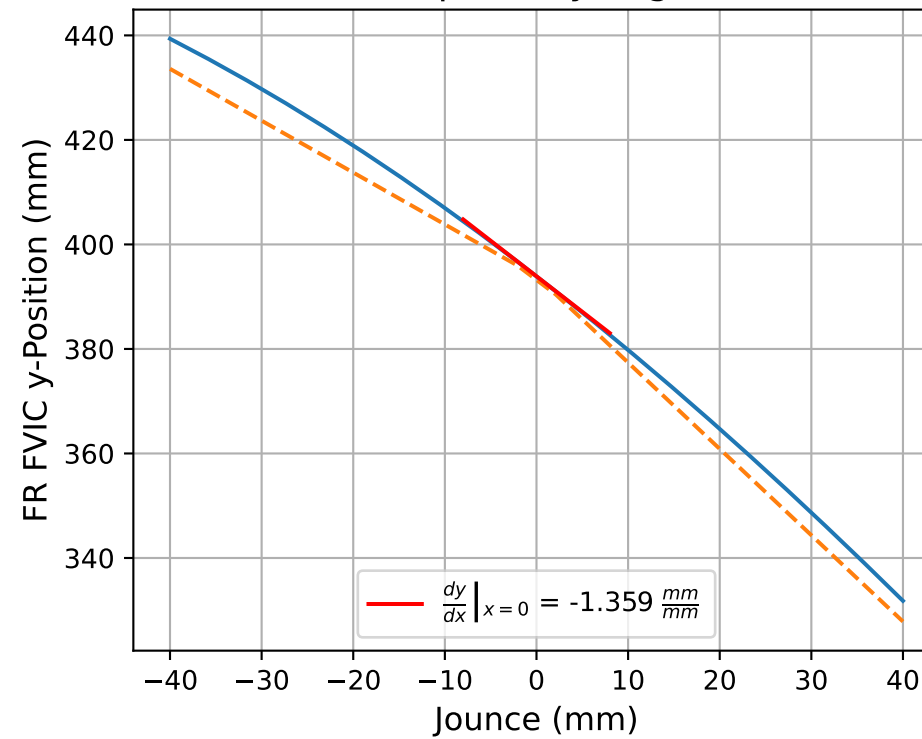


Cubic Fit		$f(x) = a_3x^3 + a_2x^2 + a_1x + a_0$
FL		$f(x) = 0.0x^3 + 0.0x^2 + 0.006x + 27.442$
FR		$f(x) = 0.0x^3 + 0.0x^2 + 0.006x + 27.442$
RL		$f(x) = 0.0x^3 + 0.0x^2 + 0.002x + 13.593$
RR		$f(x) = 0.0x^3 + 0.0x^2 + 0.002x + 13.593$

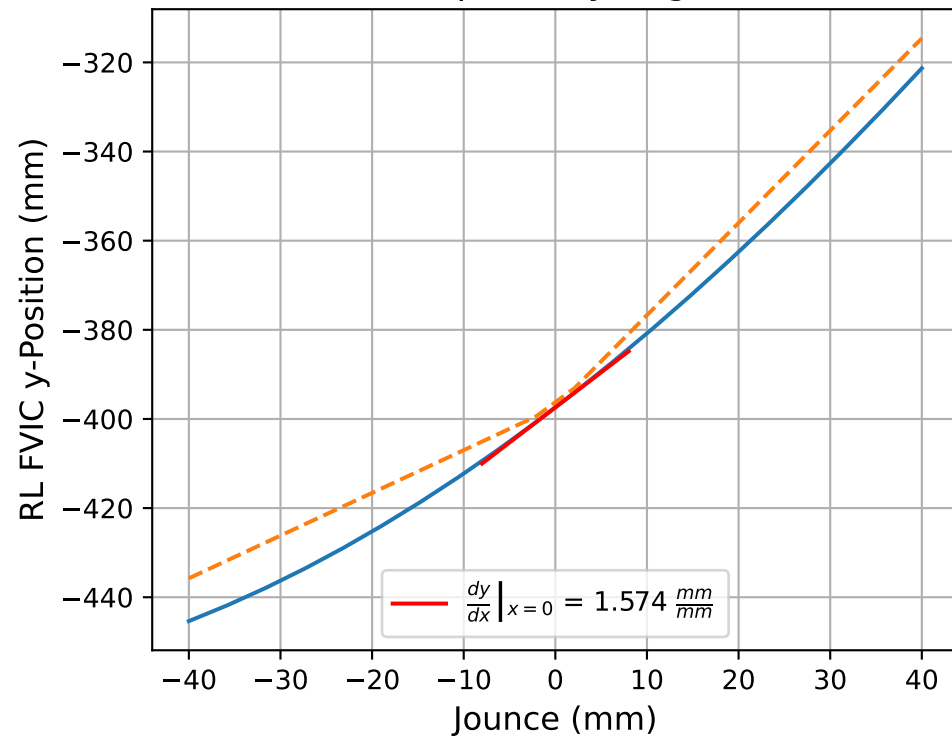
FL Bump FVIC y-Migration



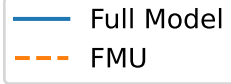
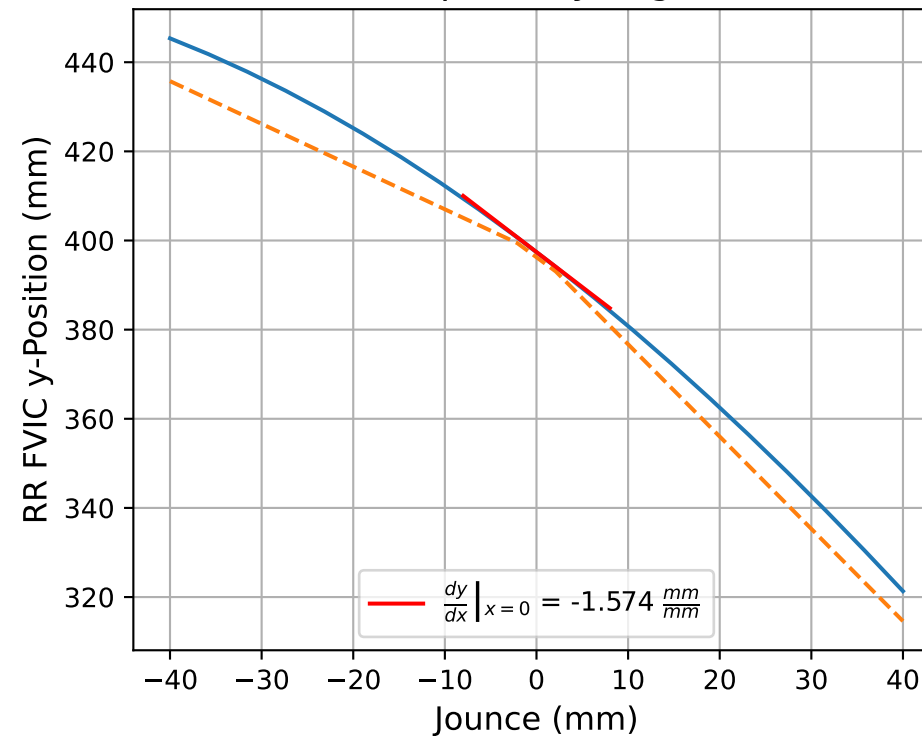
FR Bump FVIC y-Migration



RL Bump FVIC y-Migration



RR Bump FVIC y-Migration



Linear Fit

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

FL	$f(x) = 1.359x + -393.907$
FR	$f(x) = -1.359x + 393.907$
RL	$f(x) = 1.574x + -397.417$
RR	$f(x) = -1.574x + 397.417$

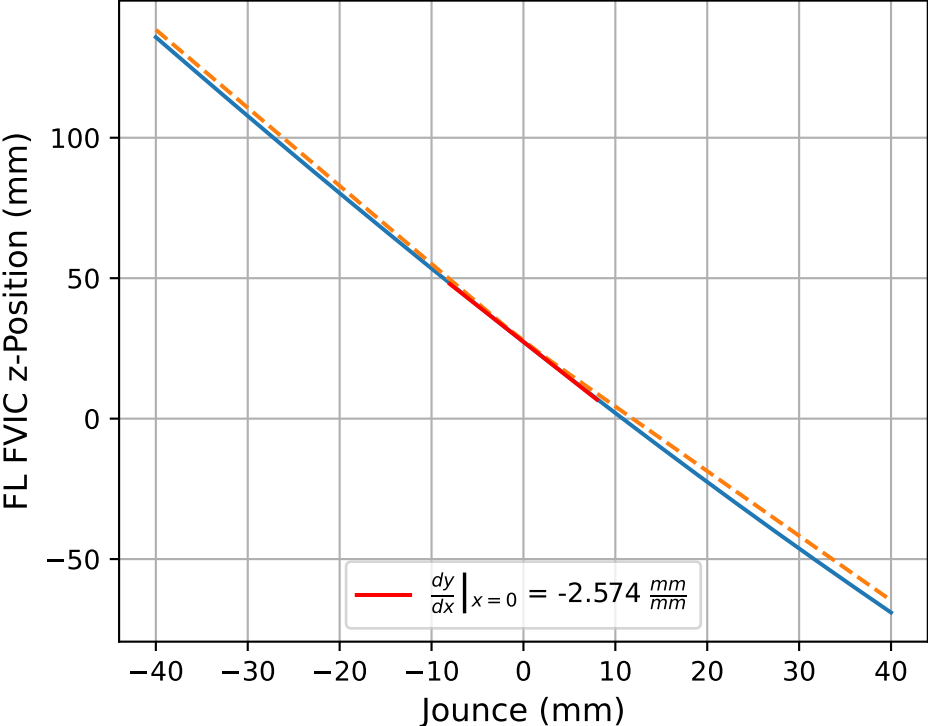
Cubic Fit

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

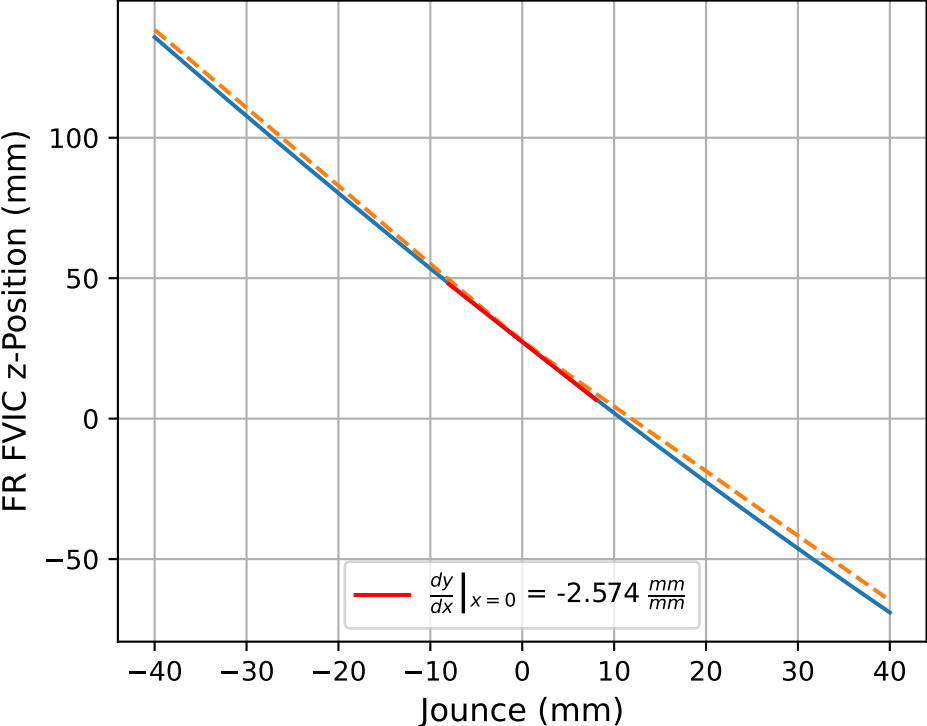
FL	$f(x) = -0.0x^3 + 0.005x^2 + 1.359x + -393.906$
FR	$f(x) = 0.0x^3 + -0.005x^2 + -1.359x + 393.906$
RL	$f(x) = -0.0x^3 + 0.009x^2 + 1.574x + -397.413$
RR	$f(x) = 0.0x^3 + -0.009x^2 + -1.574x + 397.413$



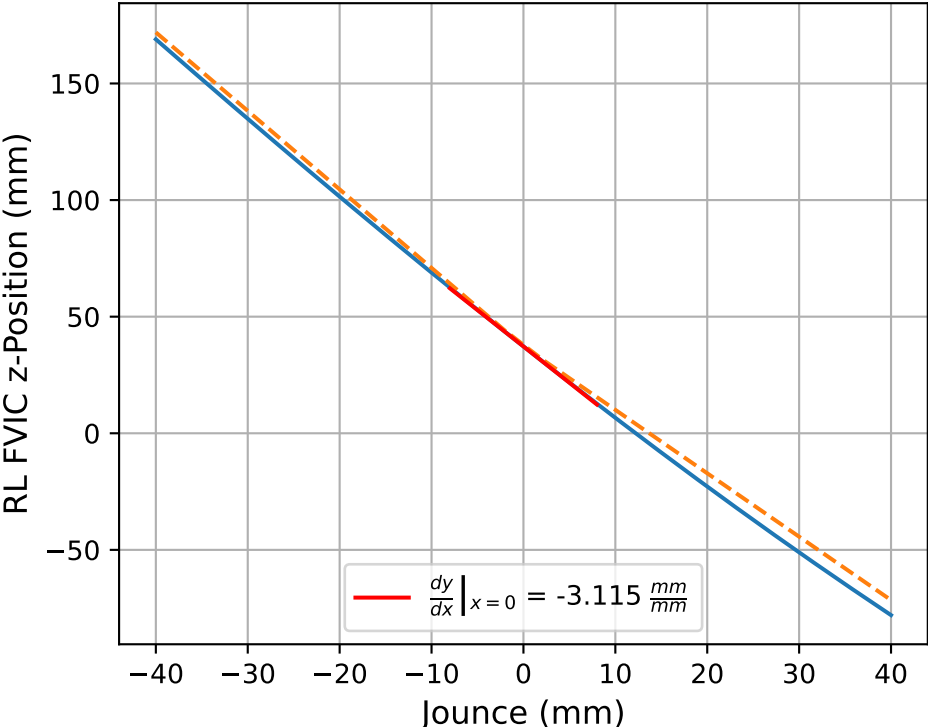
FL Bump FVIC z-Migration



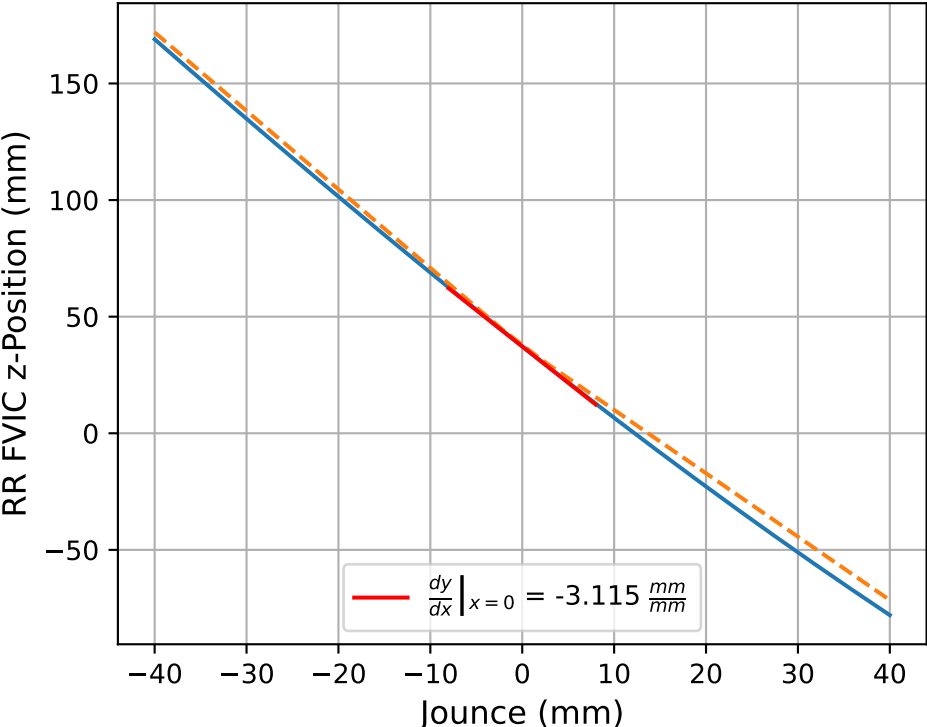
FR Bump FVIC z-Migration



RL Bump FVIC z-Migration



RR Bump FVIC z-Migration



Linear Fit

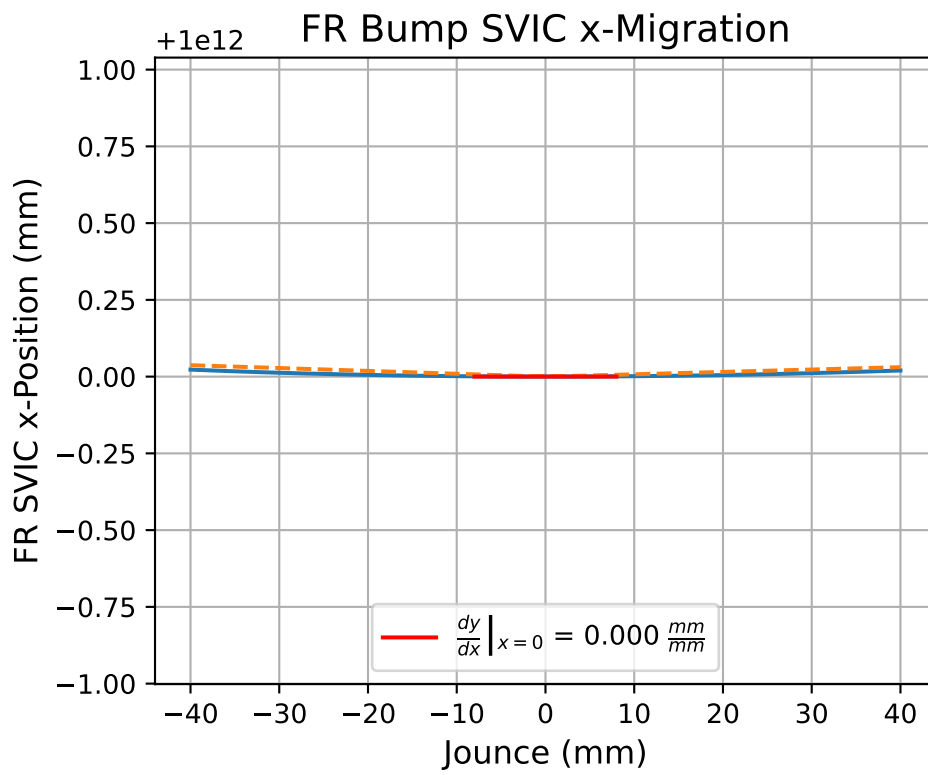
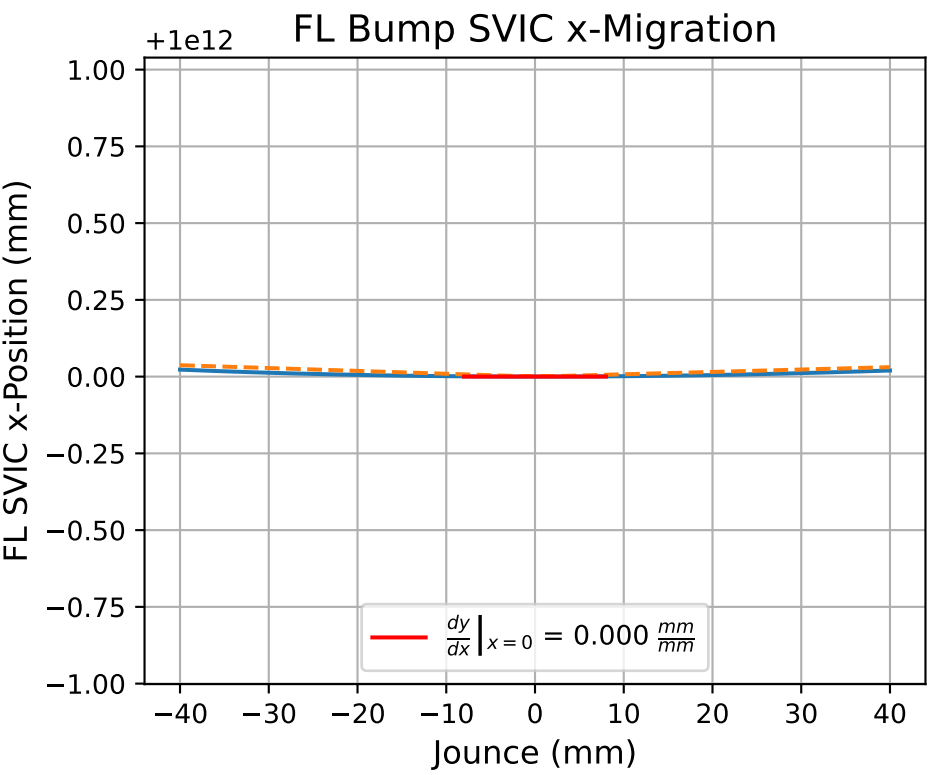
$$f(x) = a_1x + a_0$$

FL	$f(x) = -2.574x + 27.34$
FR	$f(x) = -2.574x + 27.34$
RL	$f(x) = -3.115x + 37.239$
RR	$f(x) = -3.115x + 37.239$

Cubic Fit

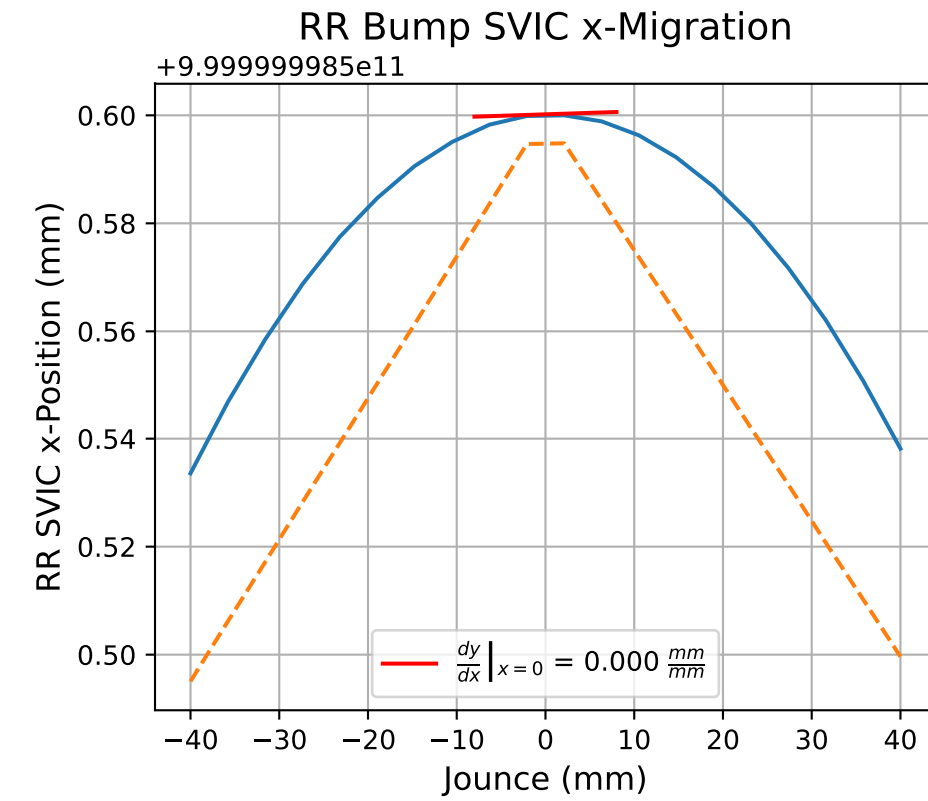
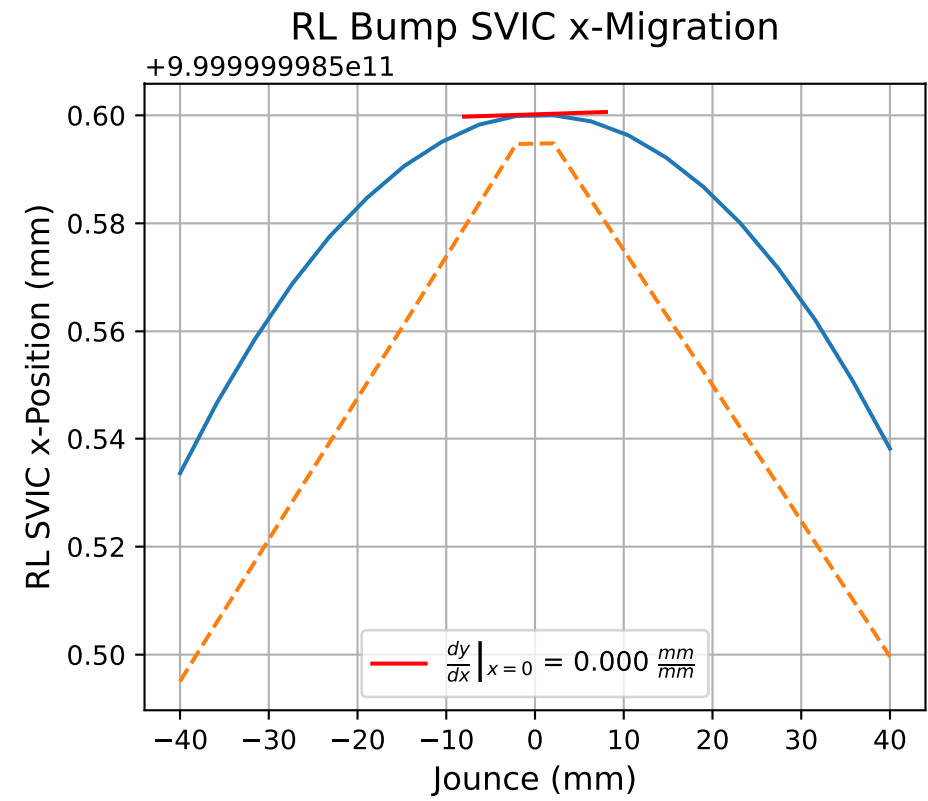
$$f(x) = a_3x^3 + a_2x^2 + a_1x + a_0$$

FL	$f(x) = 0.0x^3 + 0.004x^2 + -2.574x + 27.343$
FR	$f(x) = 0.0x^3 + 0.004x^2 + -2.574x + 27.343$
RL	$f(x) = 0.0x^3 + 0.005x^2 + -3.115x + 37.245$
RR	$f(x) = 0.0x^3 + 0.005x^2 + -3.115x + 37.245$



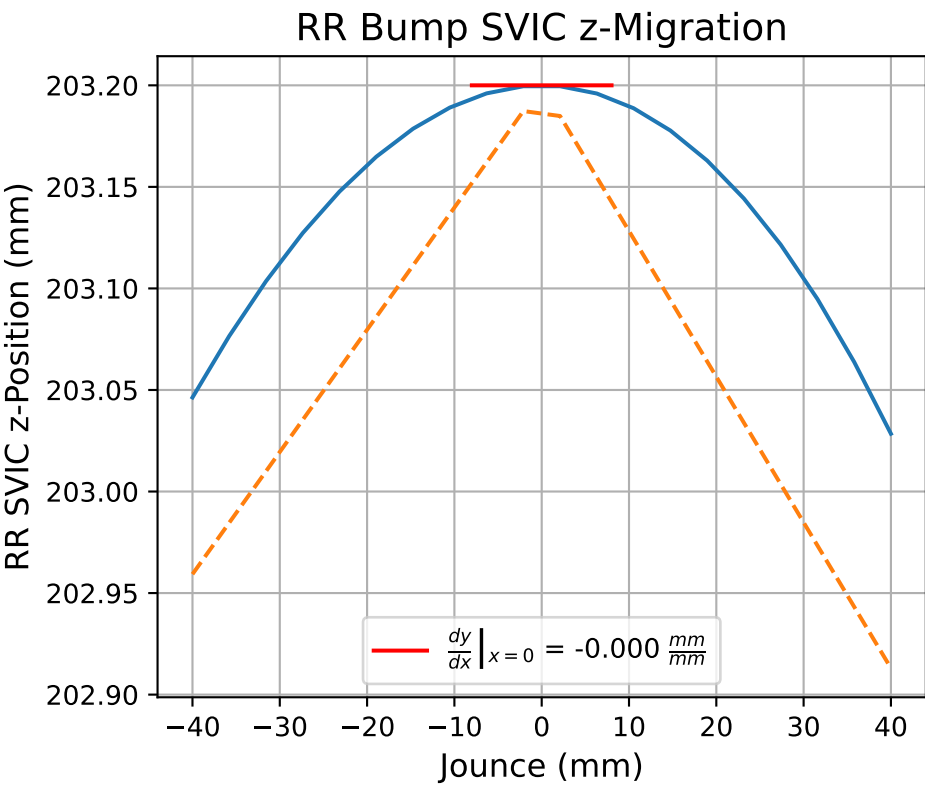
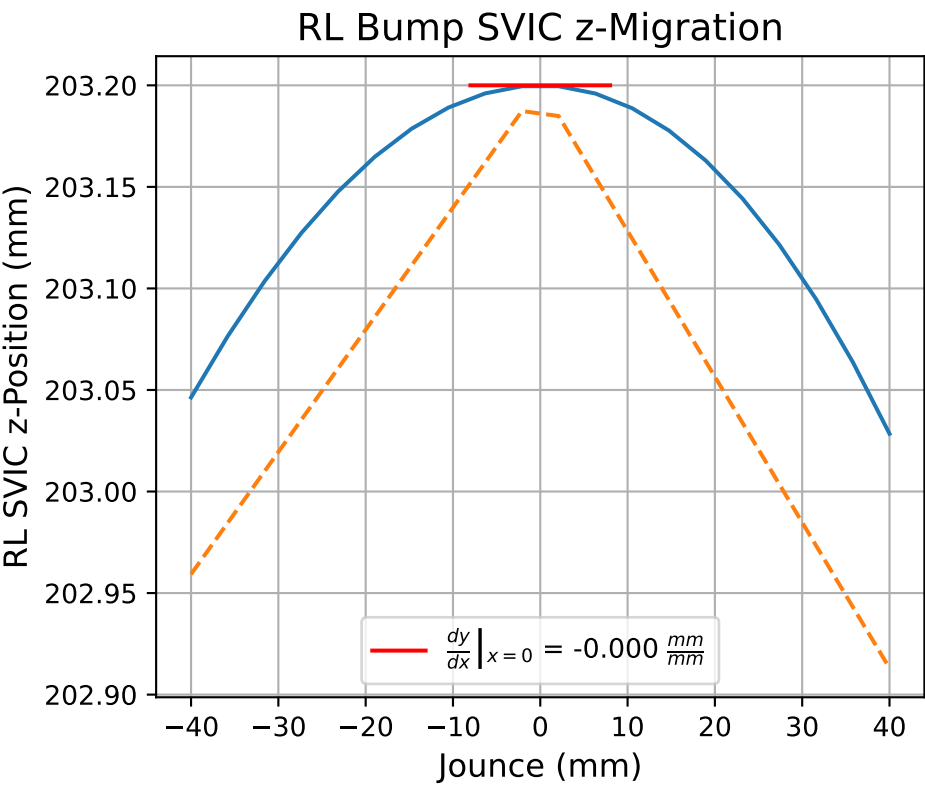
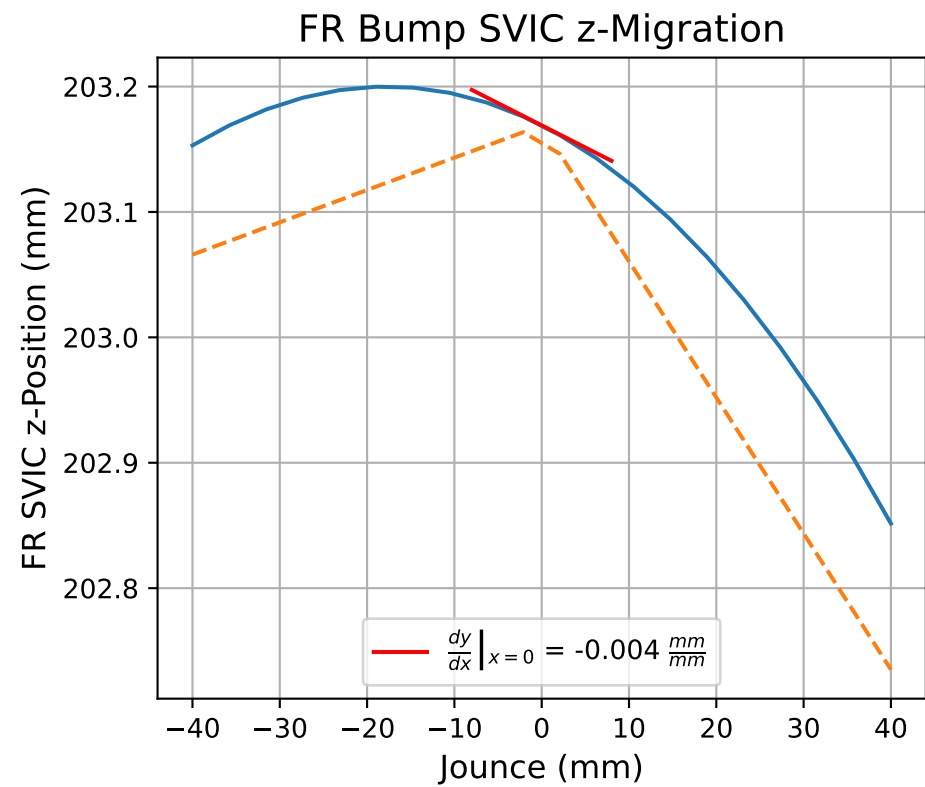
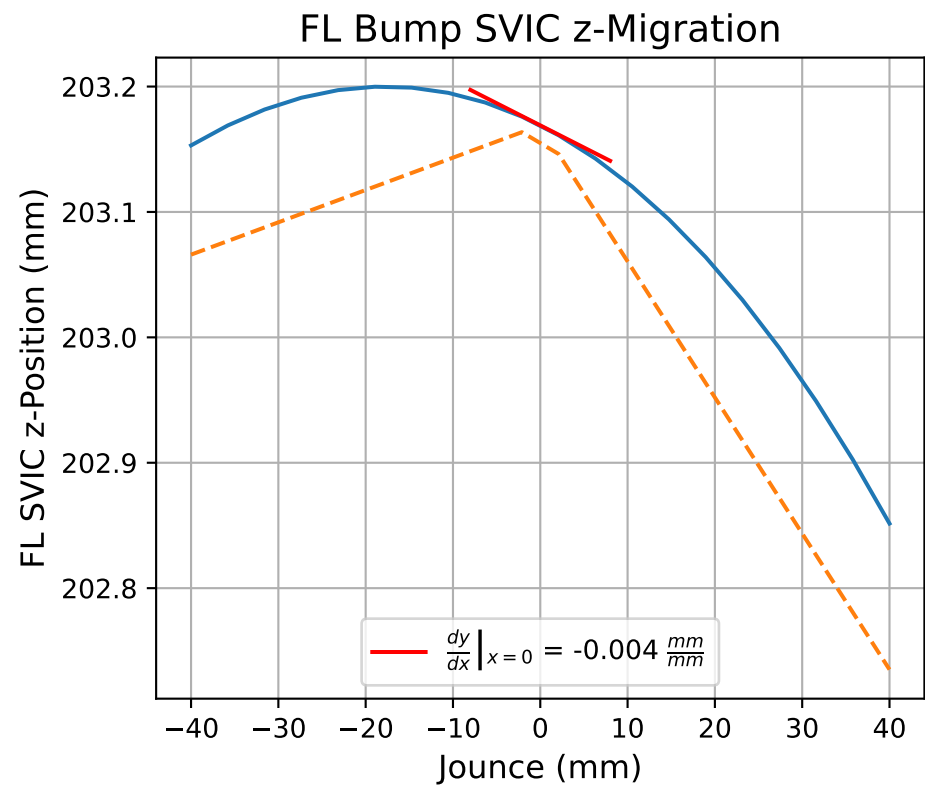
Linear Fit $f(x) = a_1x + a_0$

FL	$f(x) = 0.0x + 1.000e+12$
FR	$f(x) = 0.0x + 1.000e+12$
RL	$f(x) = 0.0x + 1.000e+12$
RR	$f(x) = 0.0x + 1.000e+12$



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

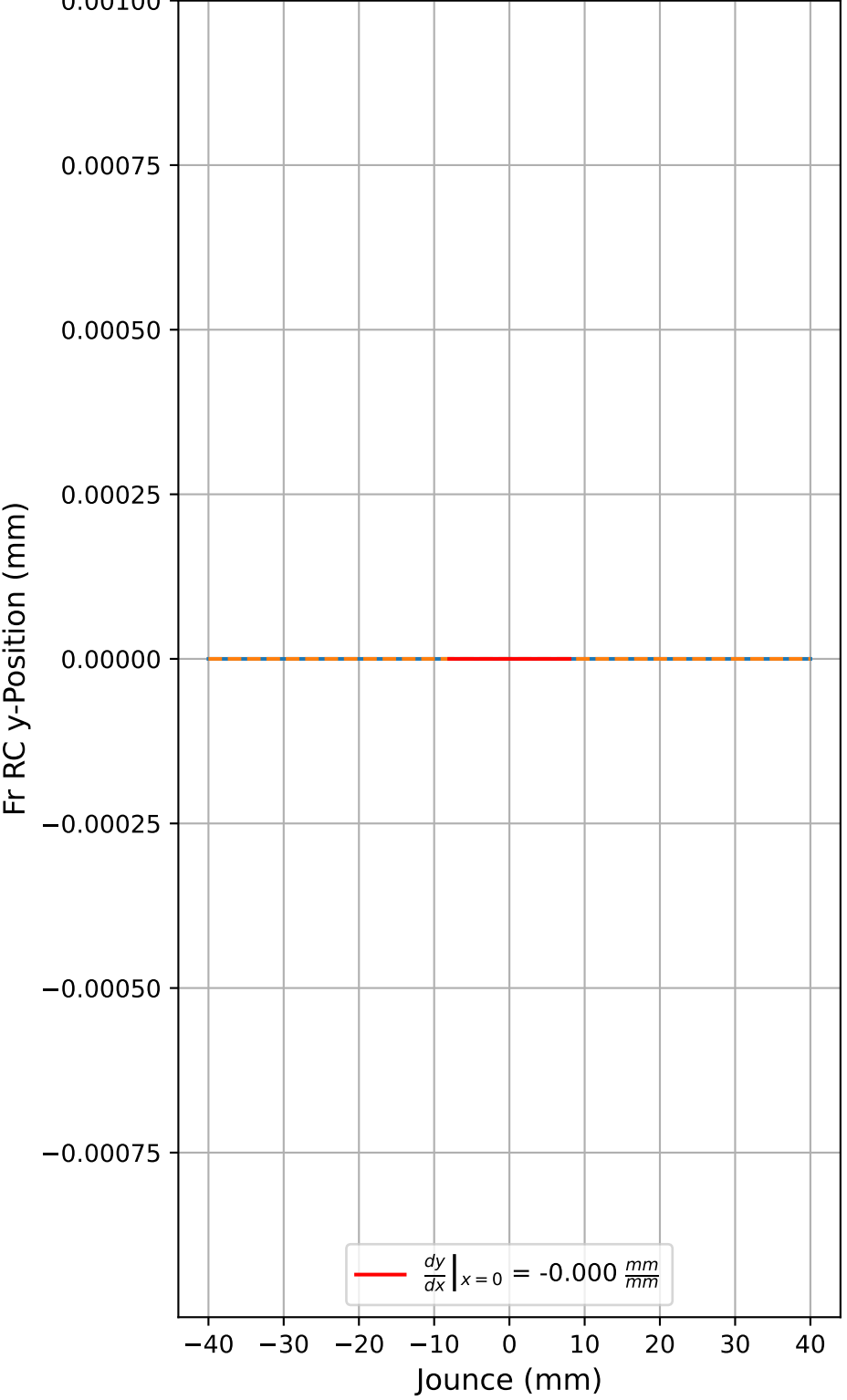
FL	$f(x) = 0.0x^3 + 0.0x^2 + -0.0x + 1.0e+12$
FR	$f(x) = 0.0x^3 + 0.0x^2 + -0.0x + 1.0e+12$
RL	$f(x) = 0.0x^3 + -0.0x^2 + 0.0x + 1.0e+12$
RR	$f(x) = 0.0x^3 + -0.0x^2 + 0.0x + 1.0e+12$



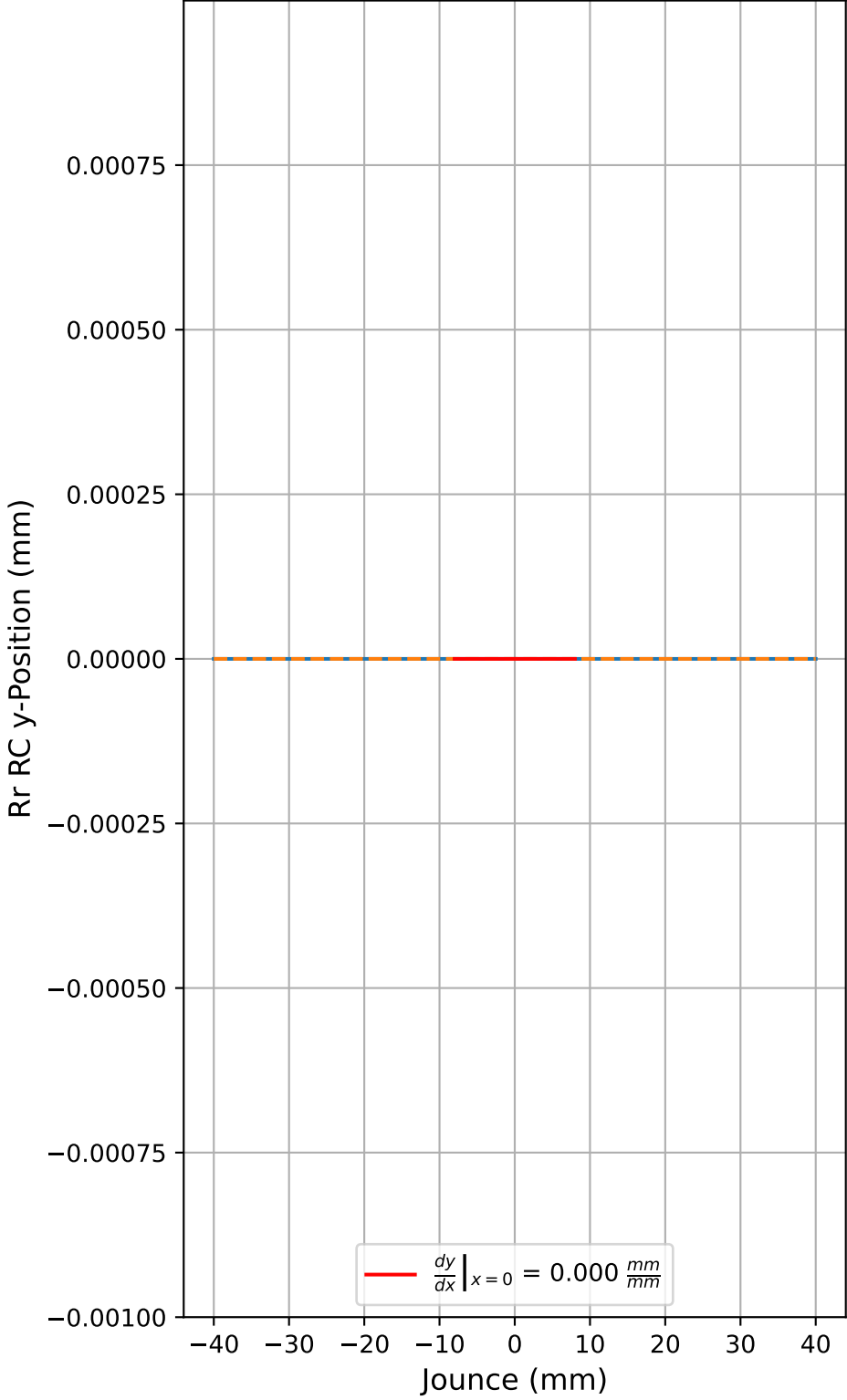
Linear Fit		$f(x) = a_1x + a_0$
FL		$f(x) = -0.004x + 203.169$
FR		$f(x) = -0.004x + 203.169$
RL		$f(x) = -0.0x + 203.2$
RR		$f(x) = -0.0x + 203.2$

Cubic Fit		$f(x) = a_3x^3 + a_2x^2 + a_1x + a_0$
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 y-Migration



Rr Bump RC y-Migration

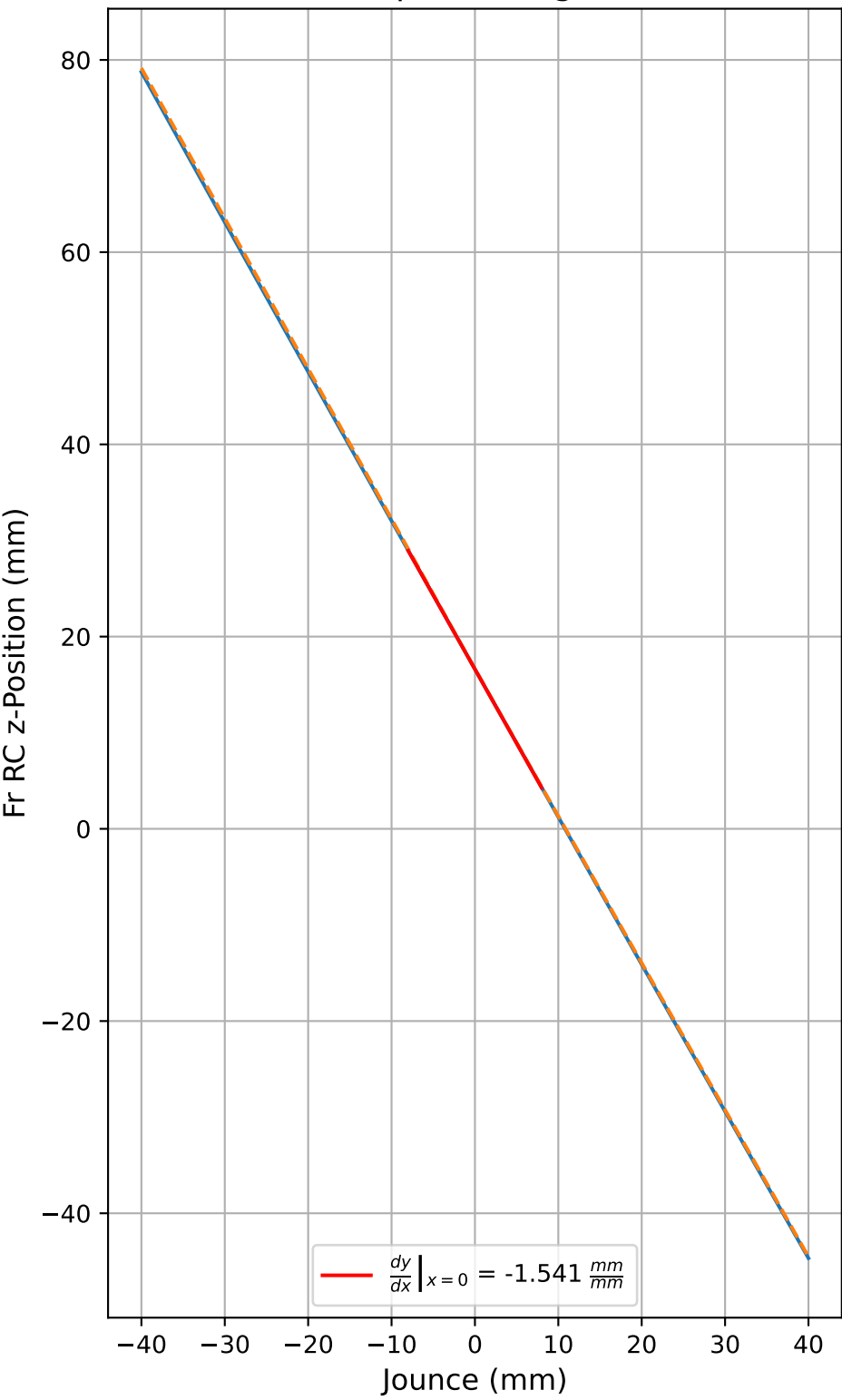


Full Model
FMU

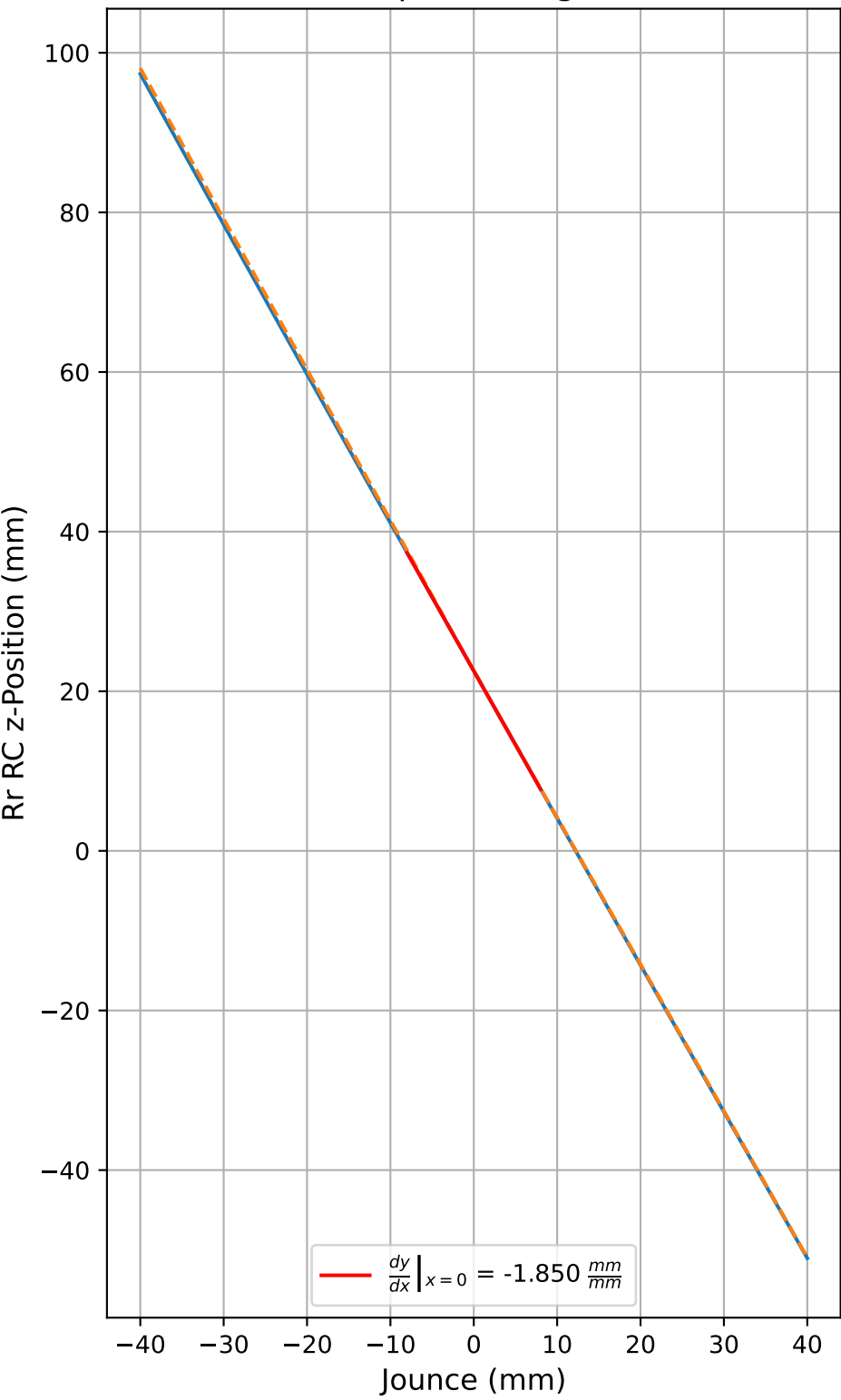
Linear Fit		$f(x) = a_1x + a_0$
Fr	$f(x) = -0.0x + -0.0$	
Rr	$f(x) = 0.0x + -0.0$	

Cubic Fit		$f(x) = a_3x^3 + a_2x^2 + a_1x + a_0$
Fr	$f(x) = -0.0x^3 + -0.0x^2 + 0.0x + 0.0$	
Rr	$f(x) = 0.0x^3 + 0.0x^2 + -0.0x + -0.0$	

Fr Bump RC z-Migration



Rr Bump RC z-Migration



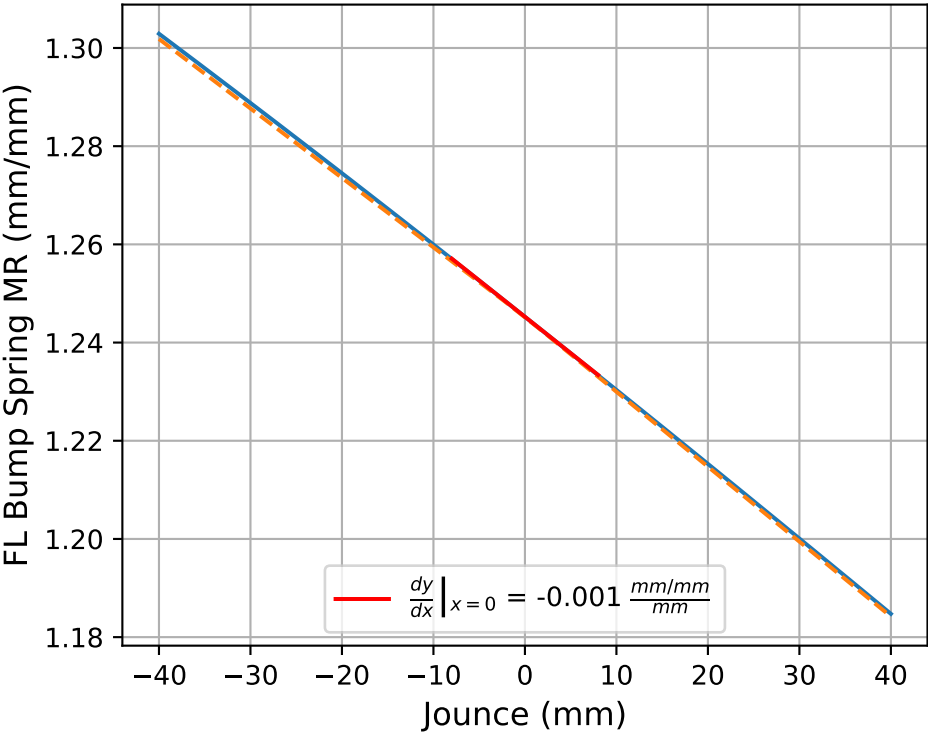
Full Model
FMU

Linear Fit		$f(x) = a_1x + a_0$
Fr	$f(x) = -1.541x + 16.608$	
Rr	$f(x) = -1.85x + 22.543$	

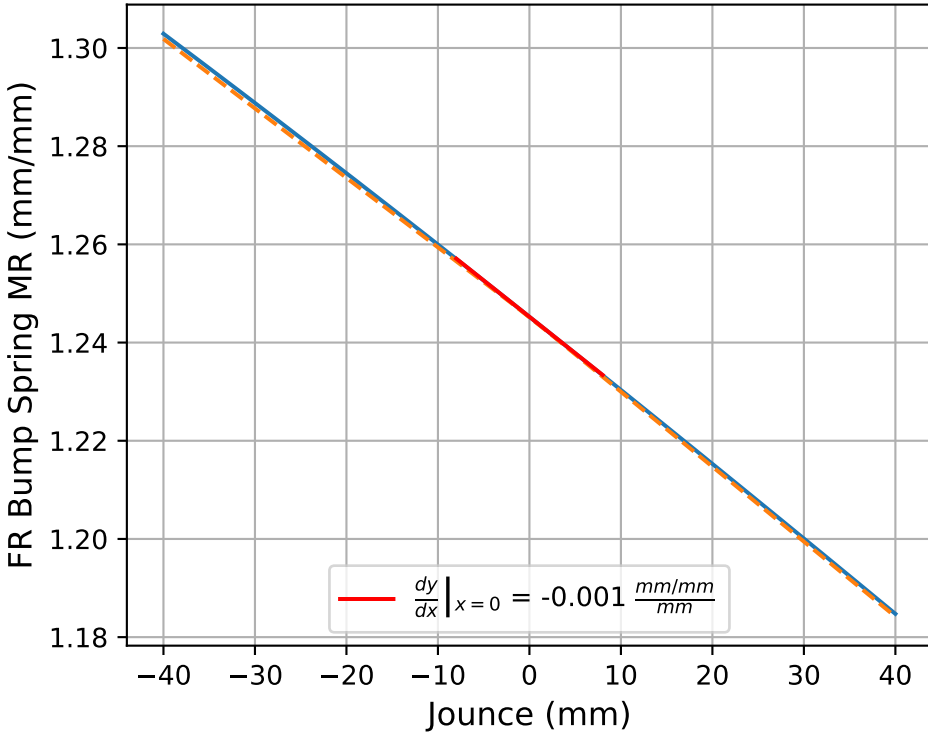
Cubic Fit		$f(x) = a_3x^3 + a_2x^2 + a_1x + a_0$
Fr	$f(x) = -0.0x^3 + 0.0x^2 + -1.541x + 16.607$	
Rr	$f(x) = -0.0x^3 + 0.0x^2 + -1.85x + 22.541$	



FL Bump Spring MRs



FR Bump Spring MRs

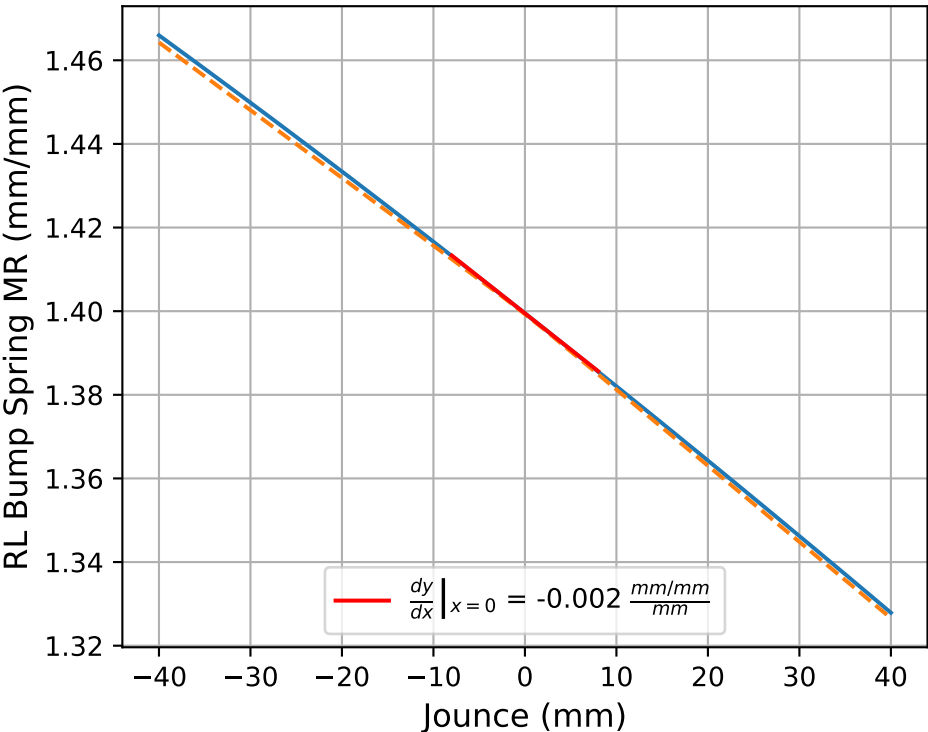


Linear Fit

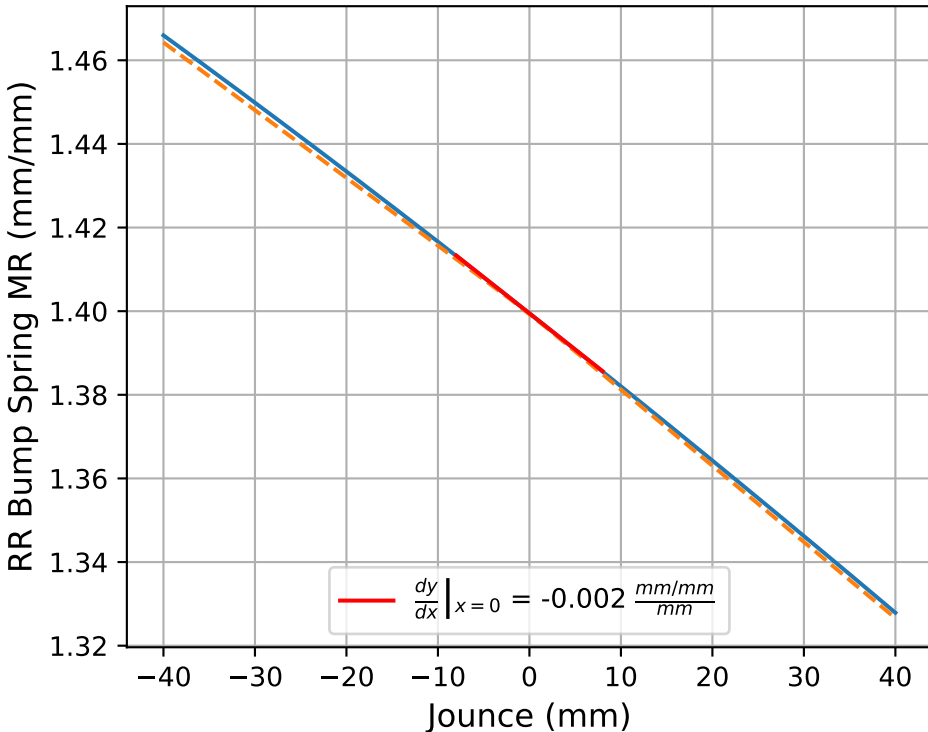
$$f(x) = a_1x + a_0$$

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

RL Bump Spring MRs



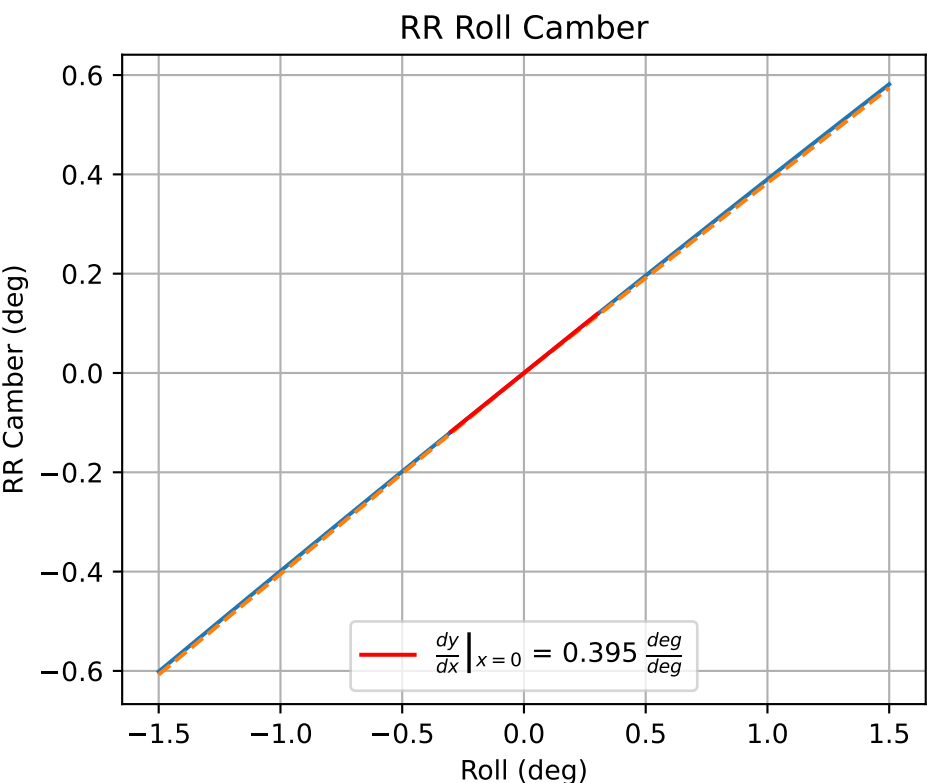
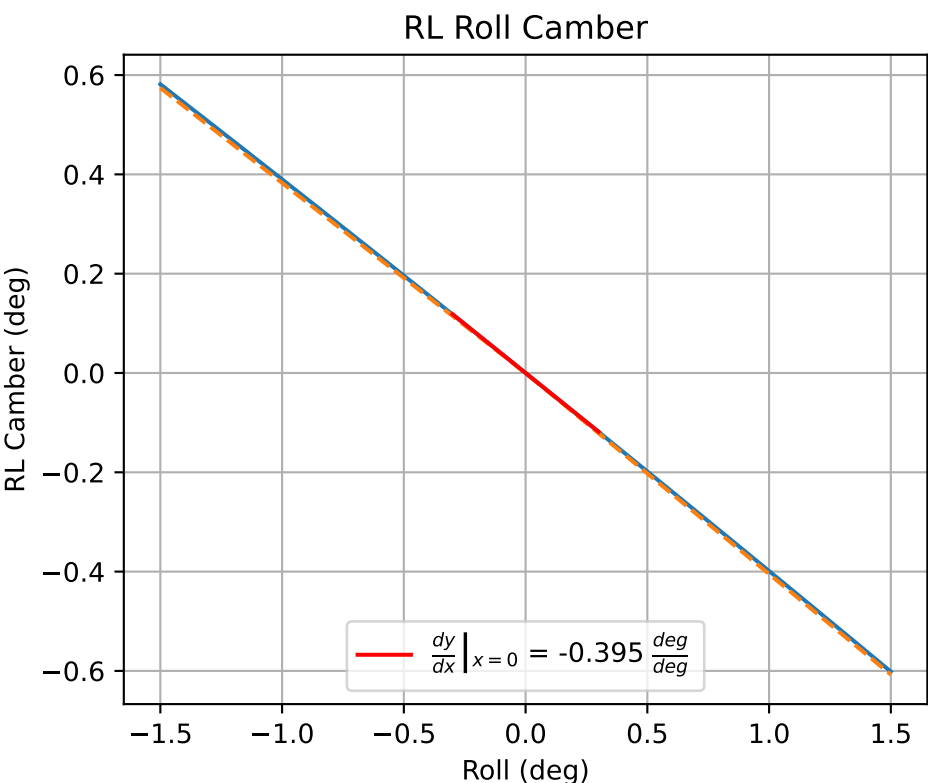
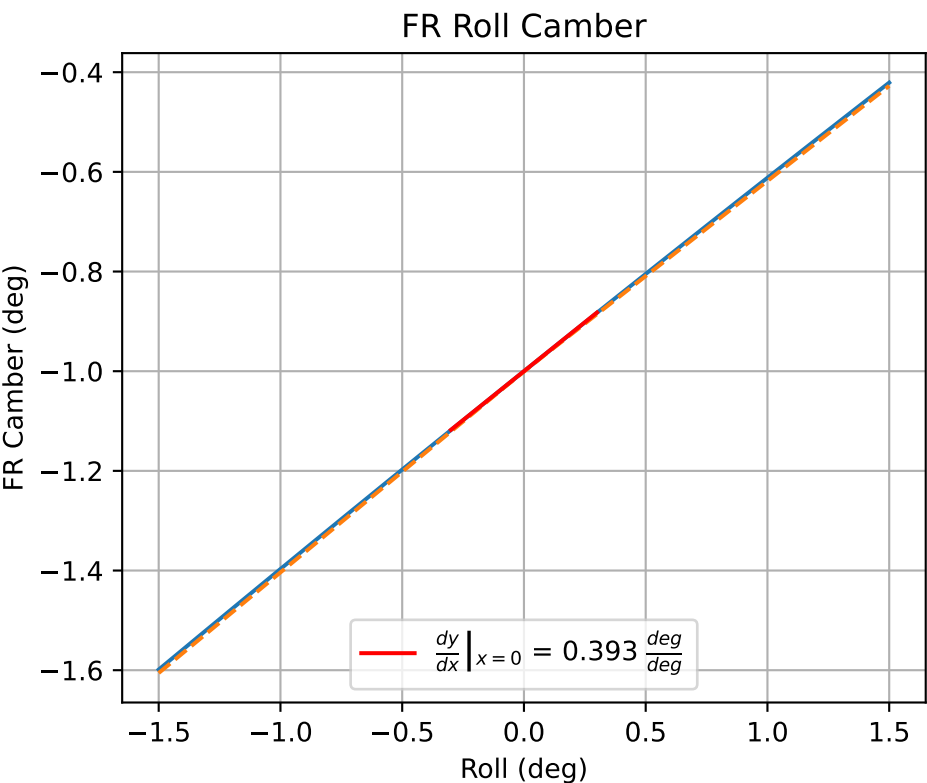
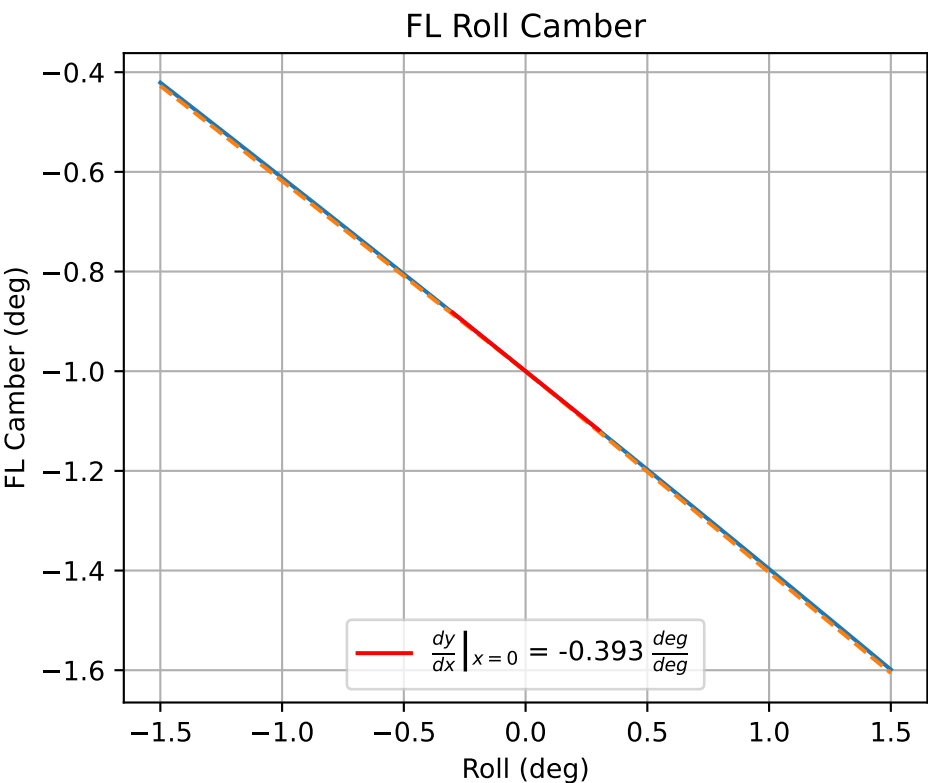
RR Bump Spring MRs



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	$f(x) = 0.0x^3 + -0.0x^2 + -0.002x + 1.399$

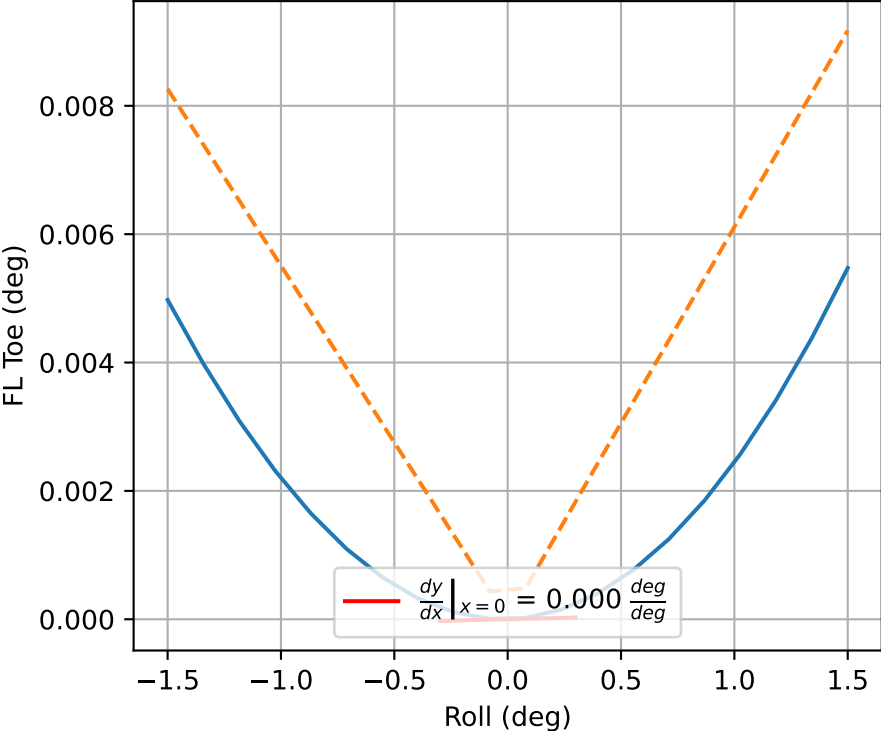


Linear Fit		$f(x) = a_1x + a_0$
FL		$f(x) = -0.393x + -1.0$
FR		$f(x) = 0.393x + -1.0$
RL		$f(x) = -0.395x + 0.0$
RR		$f(x) = 0.395x + 0.0$

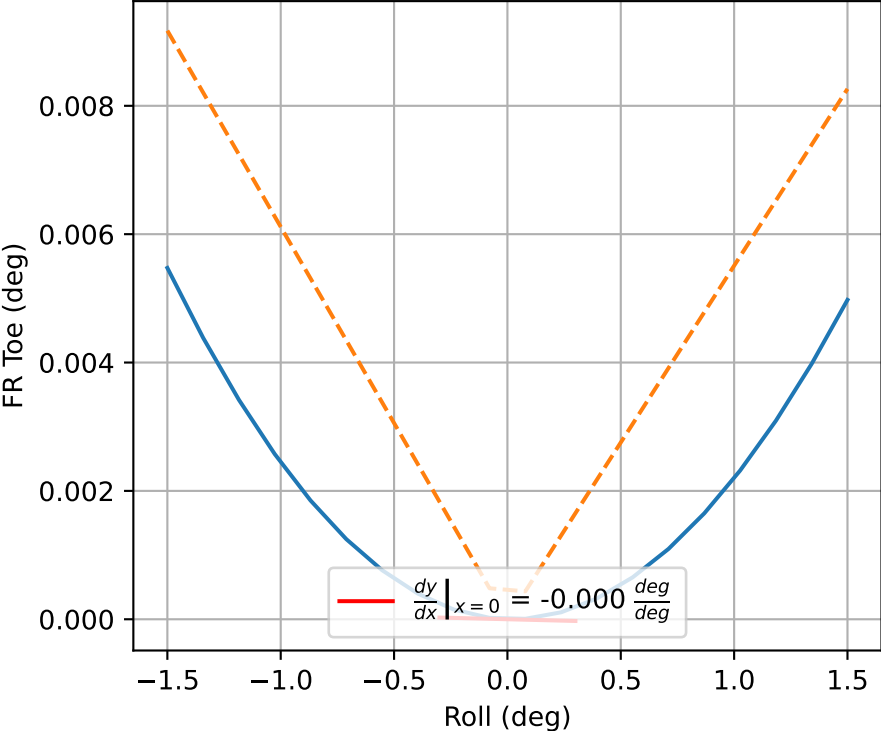
Cubic Fit		$f(x) = a_3x^3 + a_2x^2 + a_1x + a_0$
FL		$f(x) = -0.0x^3 + -0.004x^2 + -0.393x + -1.0$
FR		$f(x) = 0.0x^3 + -0.004x^2 + 0.393x + -1.0$
RL		$f(x) = 0.0x^3 + -0.004x^2 + -0.395x + 0.0$
RR		$f(x) = -0.0x^3 + -0.004x^2 + 0.395x + 0.0$



FL Roll Toe



FR Roll Toe

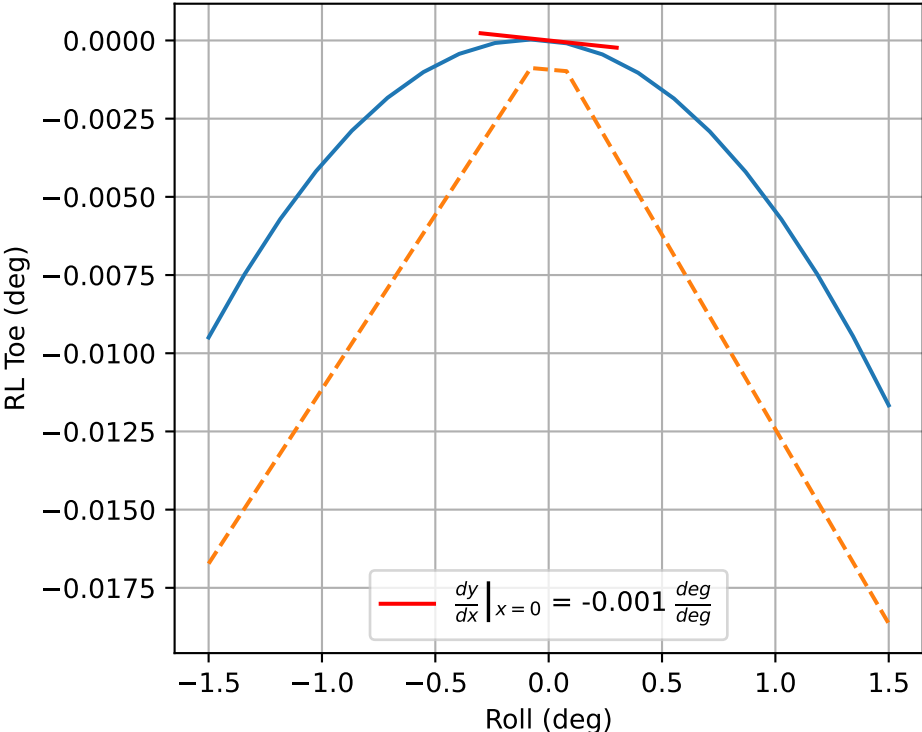


Linear Fit

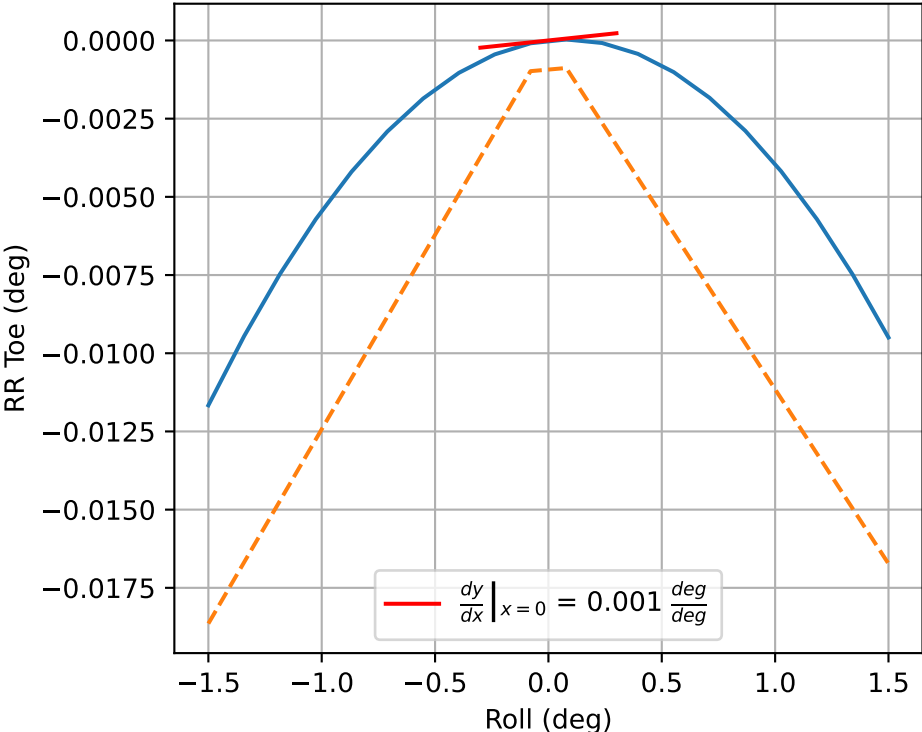
$$f(x) = a_1x + a_0$$

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



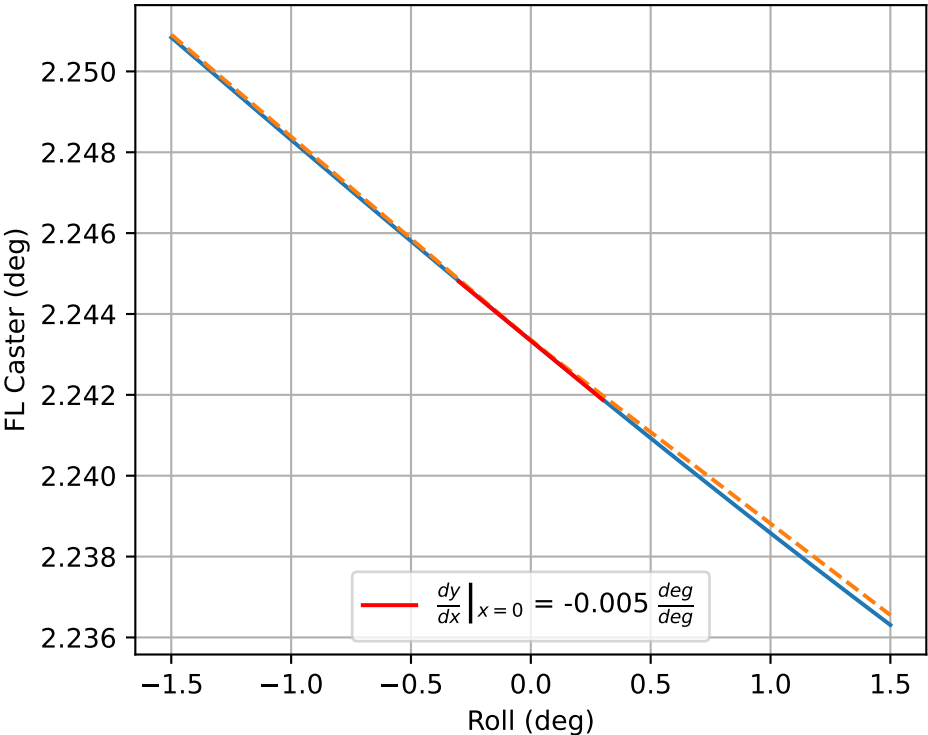
Cubic Fit

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

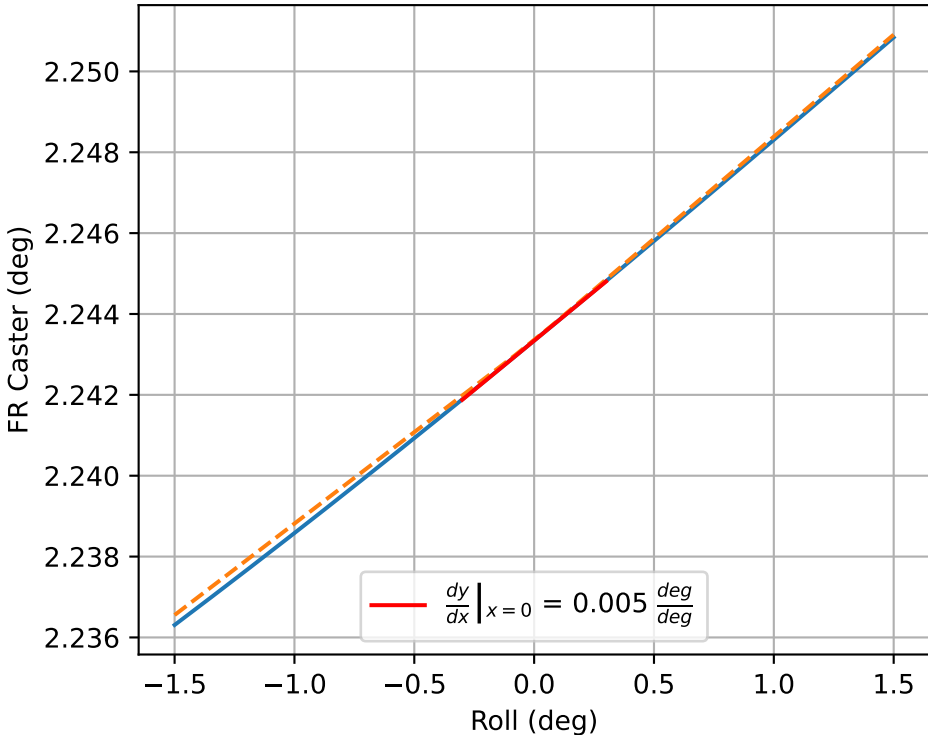
FL	$f(x) = 0.0x^3 + 0.002x^2 + 0.0x + -0.0$
FR	$f(x) = -0.0x^3 + 0.002x^2 + -0.0x + -0.0$
RL	$f(x) = 0.0x^3 + -0.005x^2 + -0.001x + 0.0$
RR	$f(x) = -0.0x^3 + -0.005x^2 + 0.001x + 0.0$



FL Roll Caster



FR Roll Caster

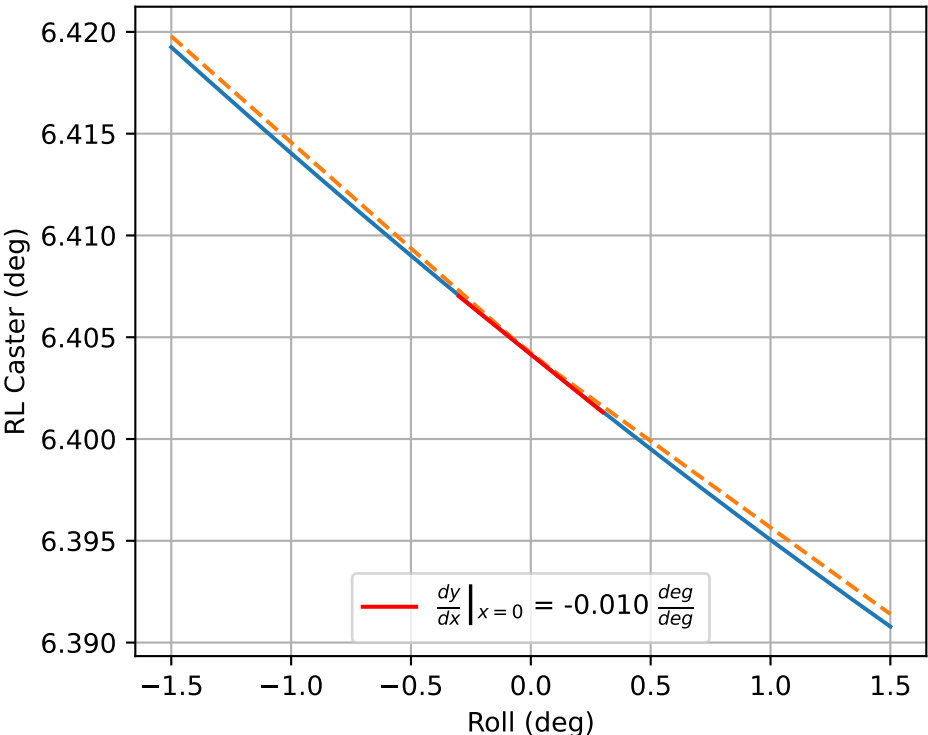


Linear Fit

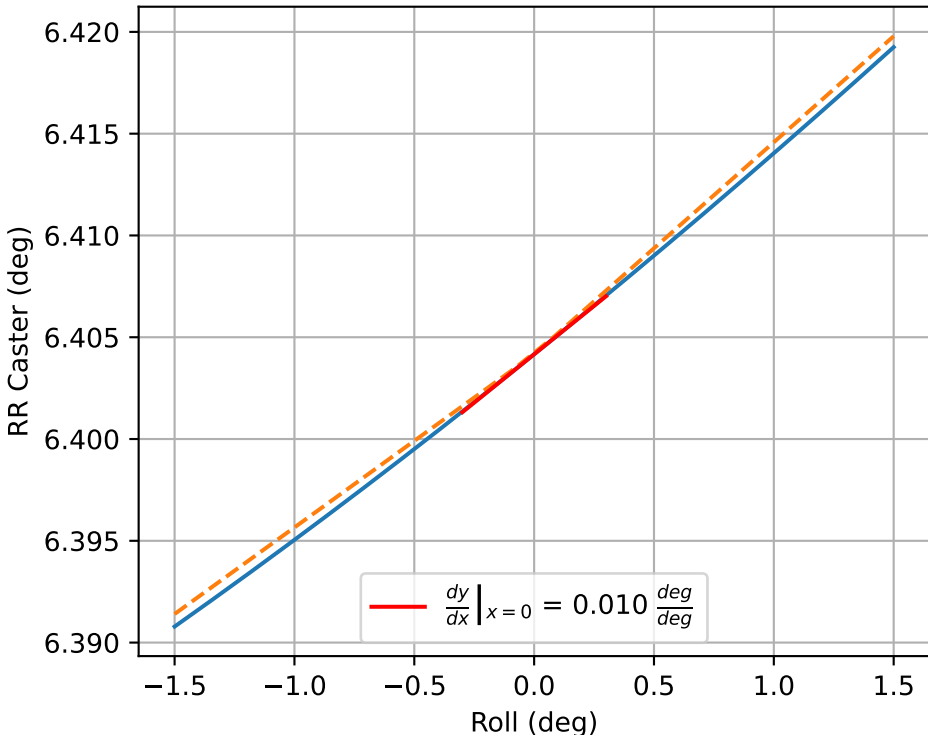
$$f(x) = a_1x + a_0$$

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

RL Roll Caster



RR Roll Caster



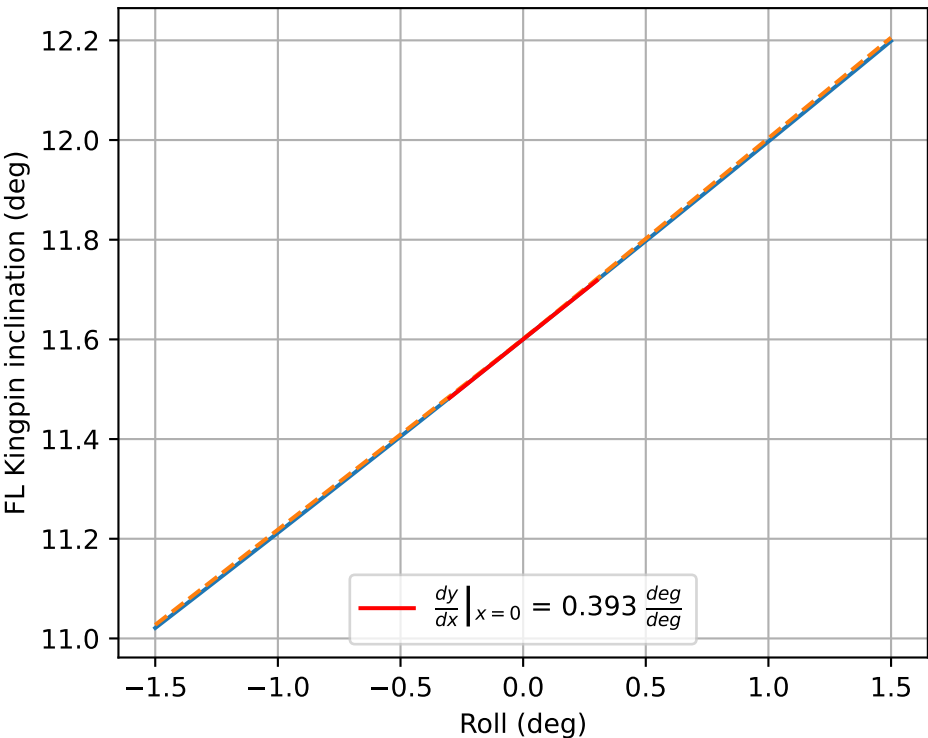
Cubic Fit

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

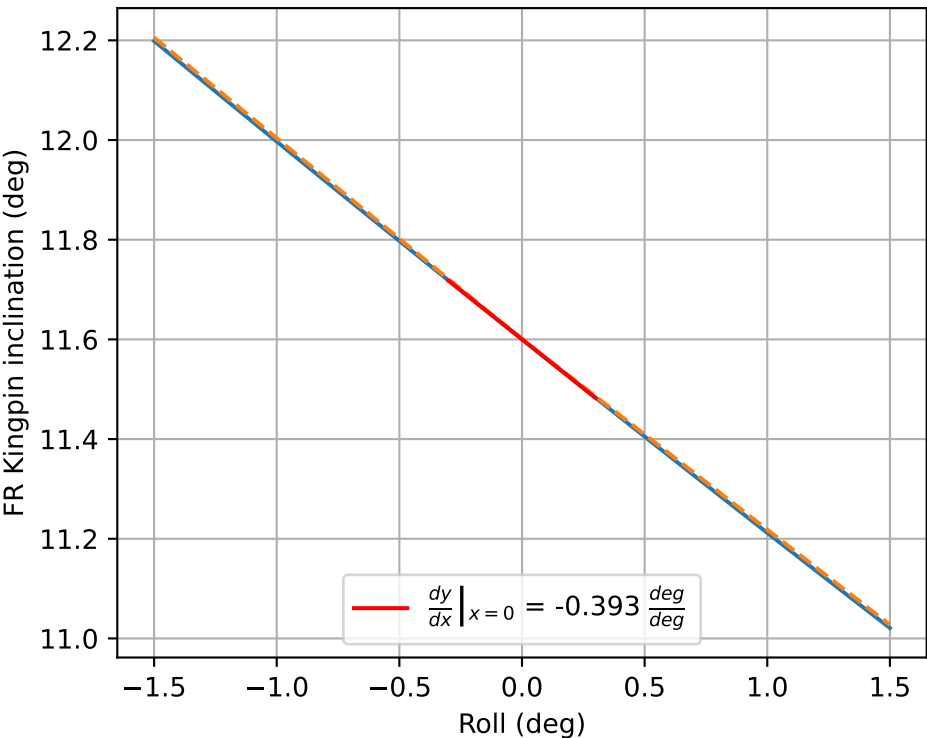
FL	$f(x) = 0.0x^3 + 0.0x^2 + -0.005x + 2.243$
FR	$f(x) = -0.0x^3 + 0.0x^2 + 0.005x + 2.243$
RL	$f(x) = 0.0x^3 + 0.0x^2 + -0.01x + 6.404$
RR	$f(x) = -0.0x^3 + 0.0x^2 + 0.01x + 6.404$



FL Roll KPI



FR Roll KPI

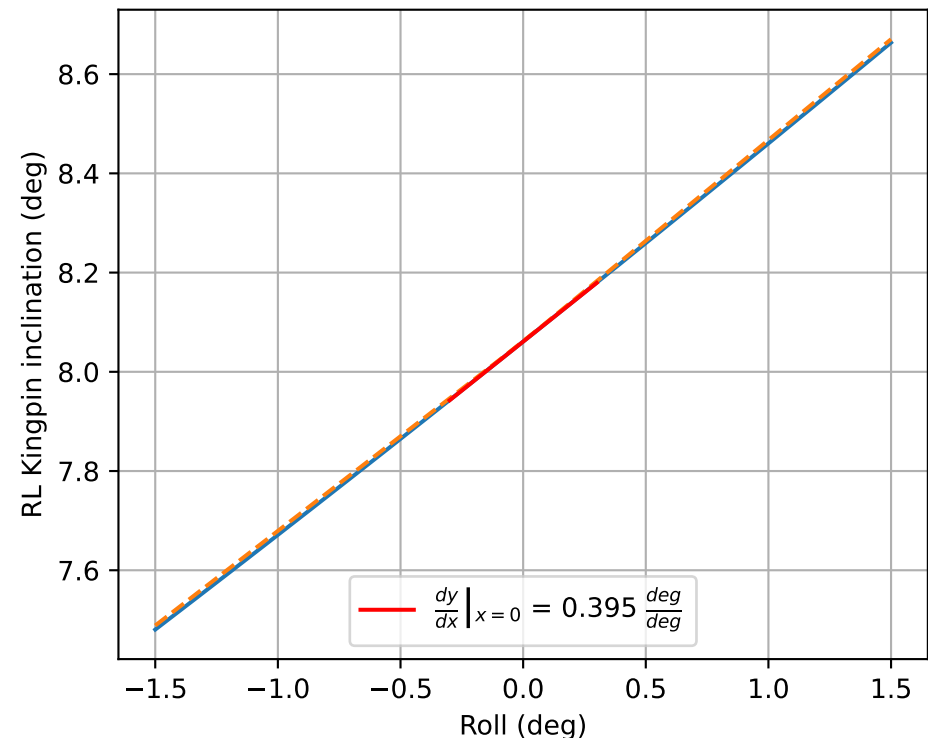


Linear Fit

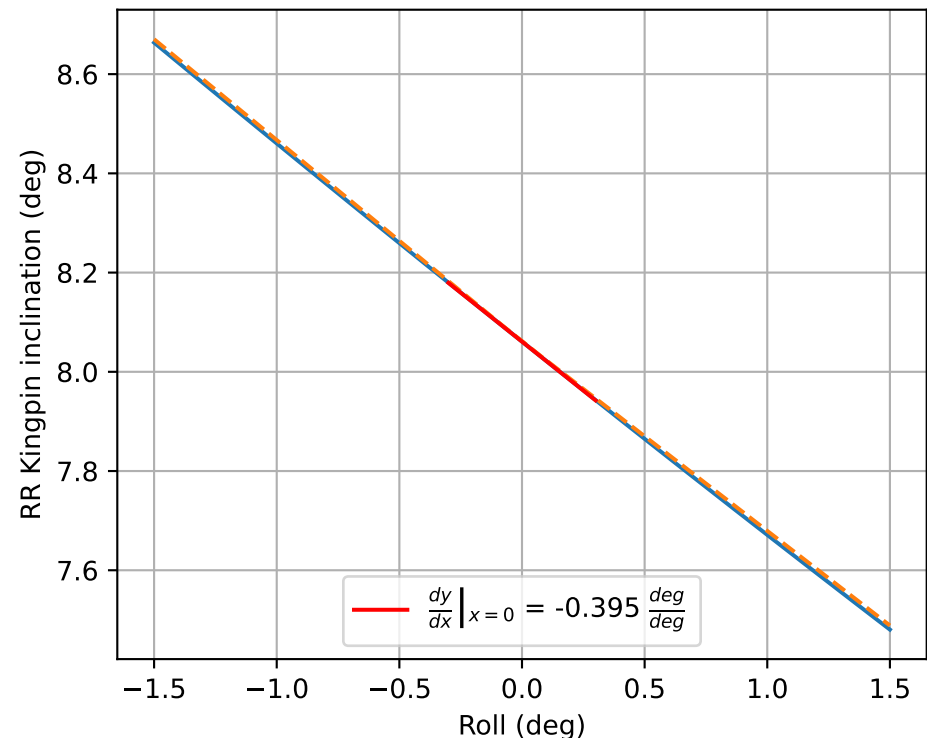
$$f(x) = a_1x + a_0$$

FL	$f(x) = 0.393x + 11.6$
FR	$f(x) = -0.393x + 11.6$
RL	$f(x) = 0.395x + 8.061$
RR	$f(x) = -0.395x + 8.061$

RL Roll KPI



RR Roll KPI

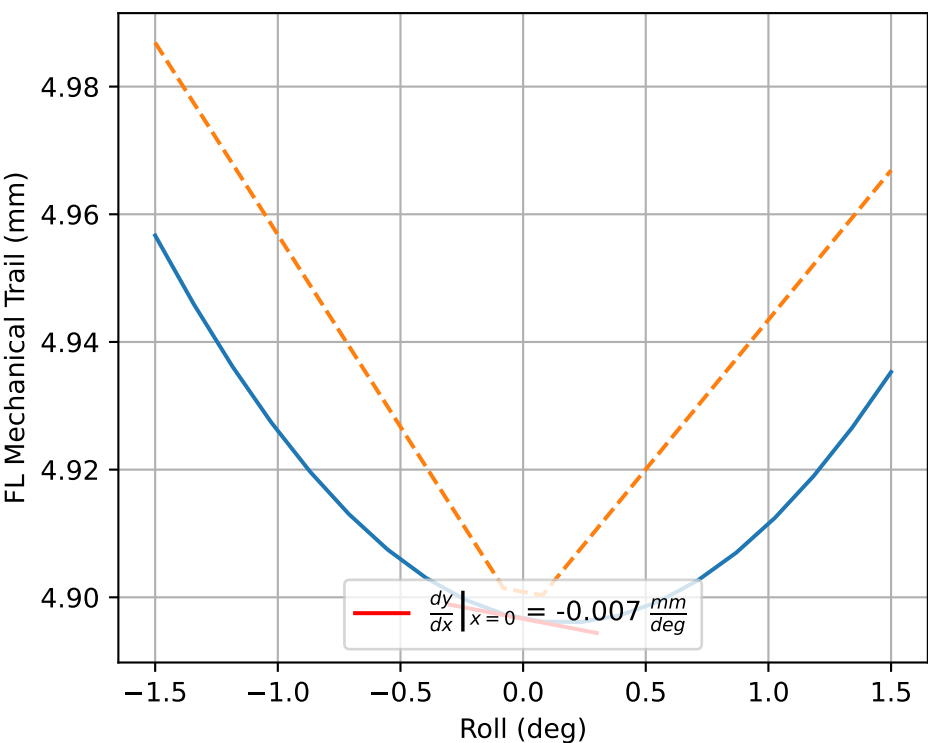


Cubic Fit

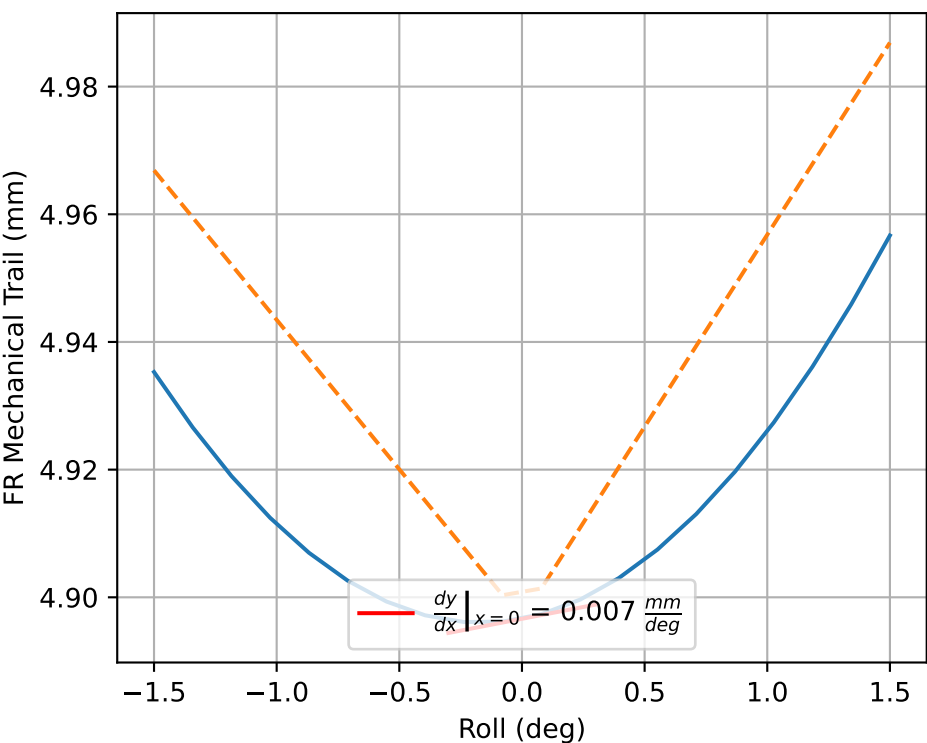
$$f(x) = a_3x^3 + a_2x^2 + a_1x + a_0$$

FL	$f(x) = 0.0x^3 + 0.004x^2 + 0.393x + 11.6$
FR	$f(x) = -0.0x^3 + 0.004x^2 + -0.393x + 11.6$
RL	$f(x) = -0.0x^3 + 0.005x^2 + 0.395x + 8.061$
RR	$f(x) = 0.0x^3 + 0.005x^2 + -0.395x + 8.061$

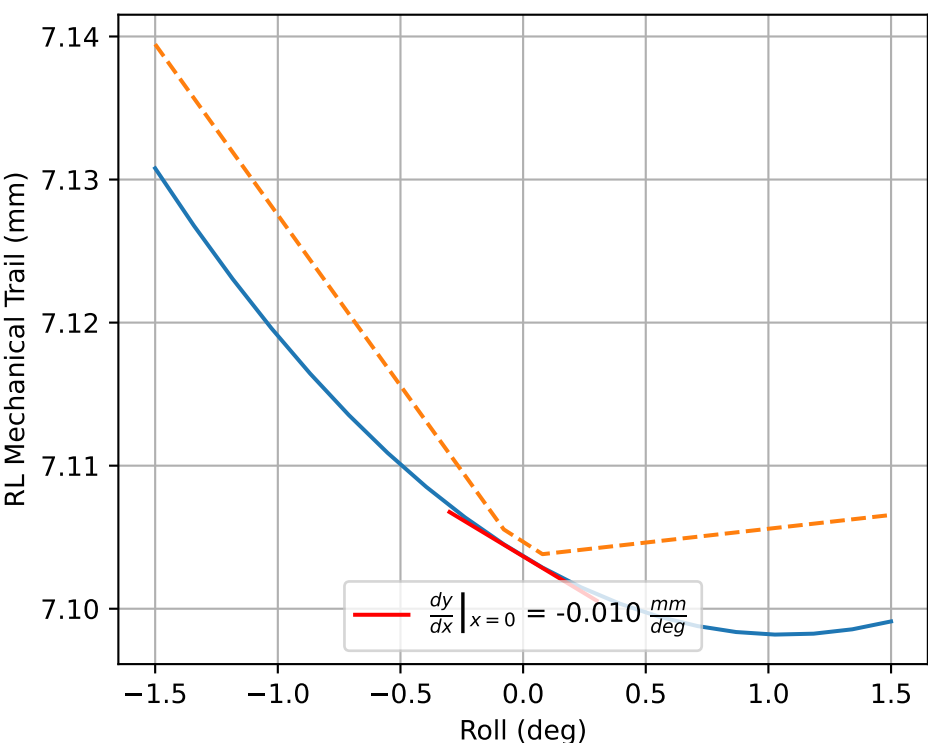
FL Roll Mechanical Trail



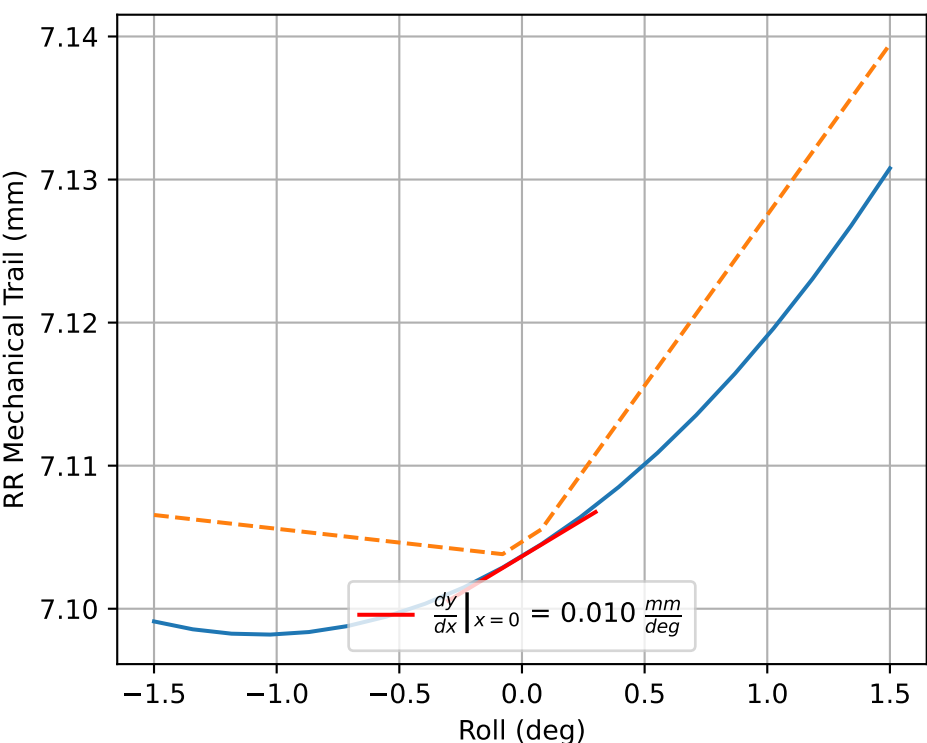
FR Roll Mechanical Trail



RL Roll Mechanical Trail



RR 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	$f(x) = 0.01x + 7.104$

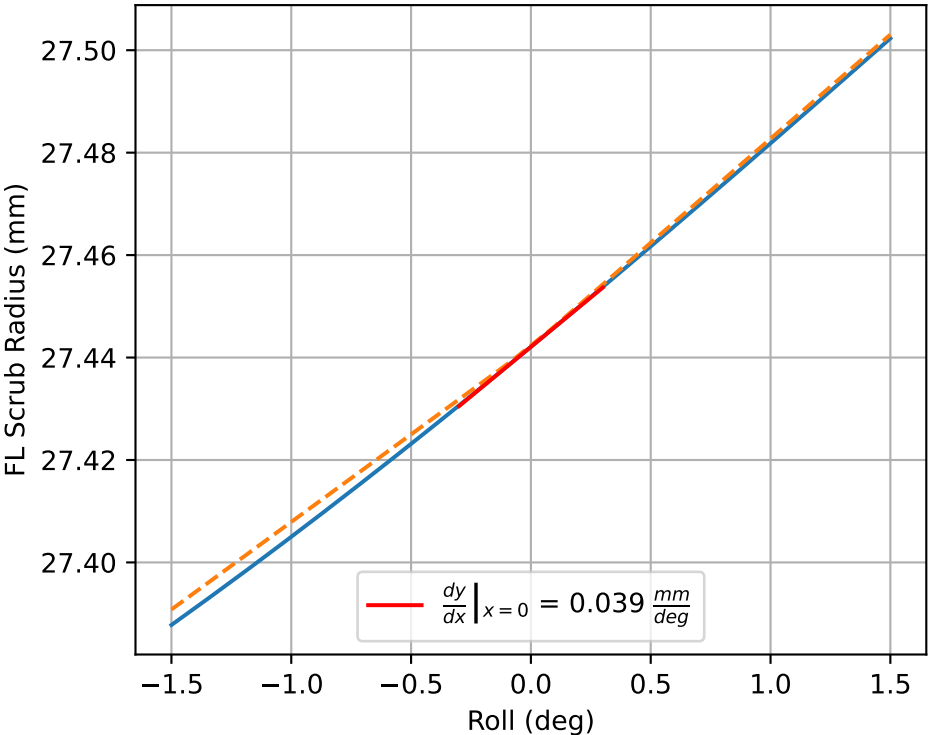
Cubic Fit

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

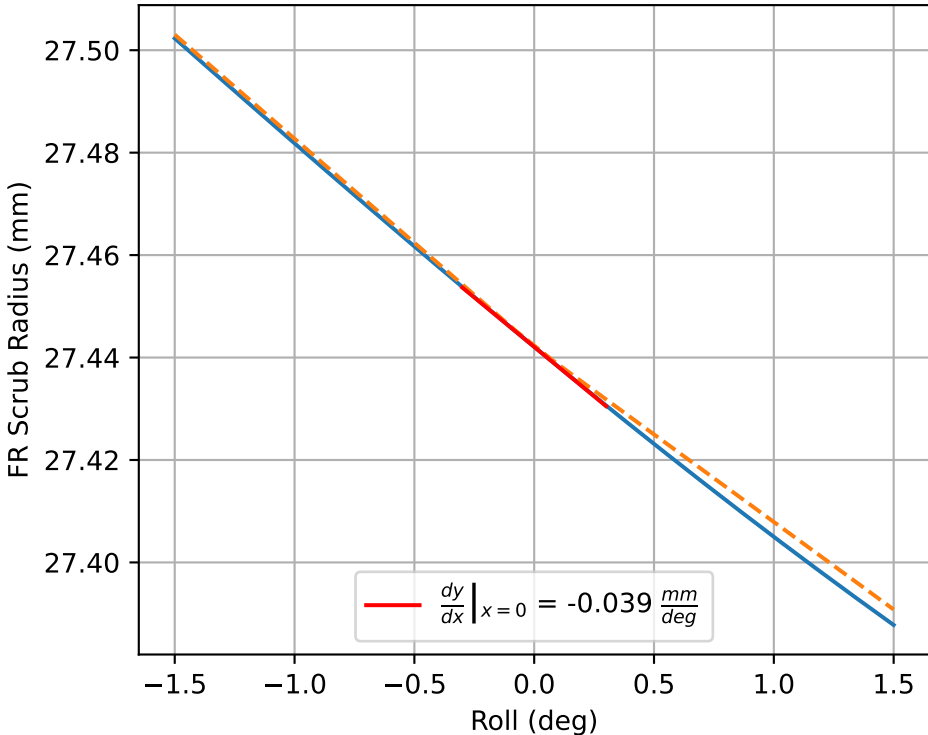
FL	$f(x) = 0.0x^3 + 0.022x^2 - 0.007x + 4.897$
FR	$f(x) = -0.0x^3 + 0.022x^2 + 0.007x + 4.897$
RL	$f(x) = -0.0x^3 + 0.005x^2 - 0.01x + 7.104$
RR	$f(x) = 0.0x^3 + 0.005x^2 + 0.01x + 7.104$



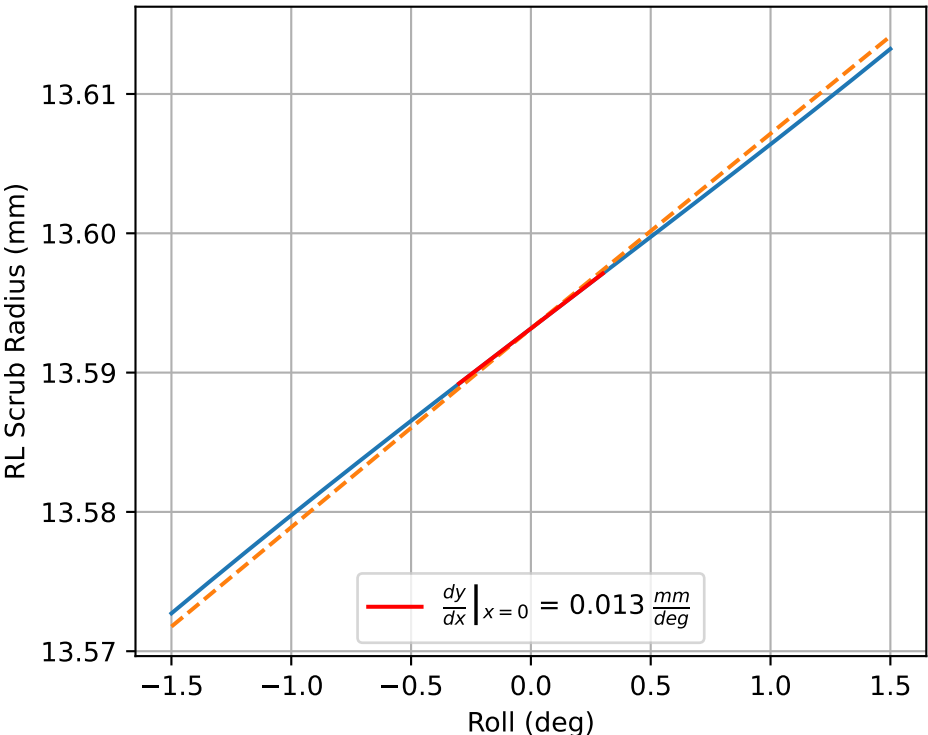
FL Roll Scrub Radius



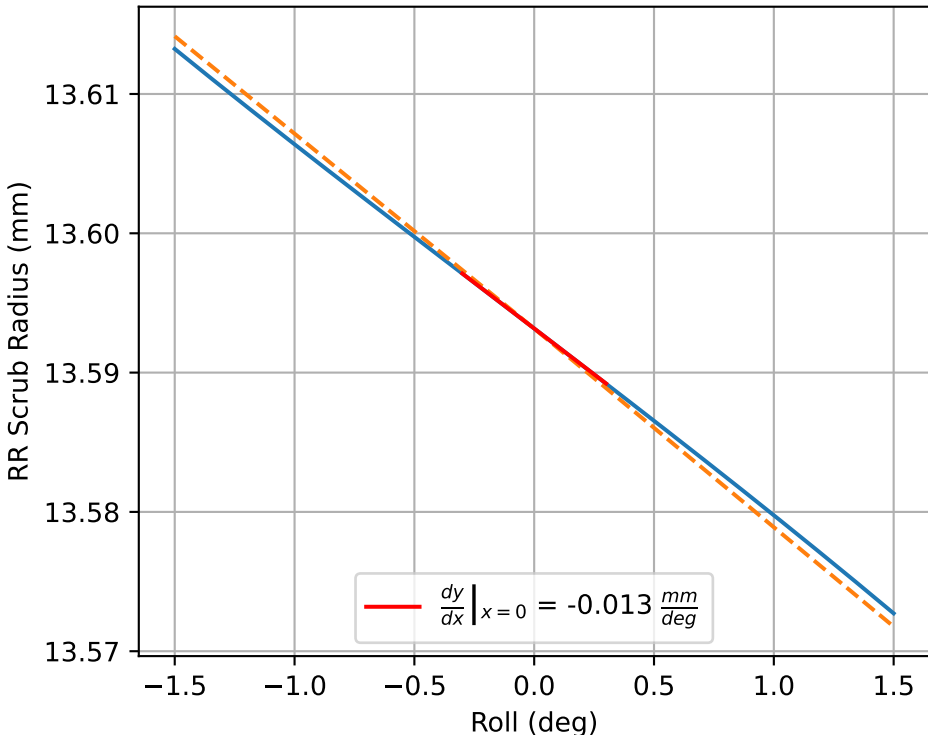
FR Roll Scrub Radius



RL Roll Scrub Radius



RR Roll Scrub Radius



Linear Fit

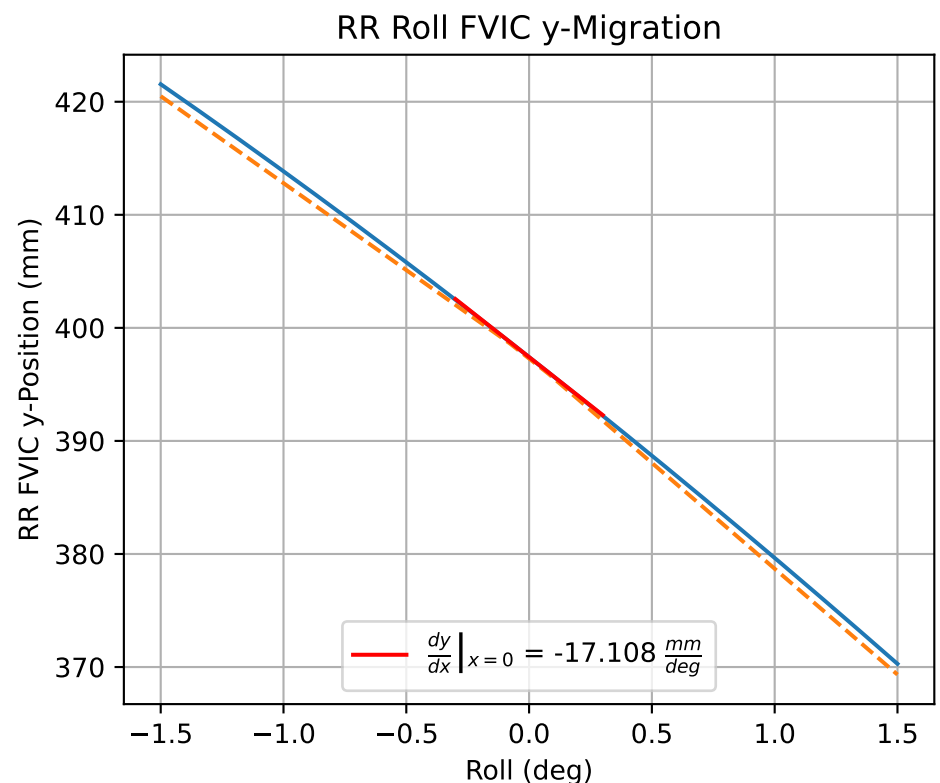
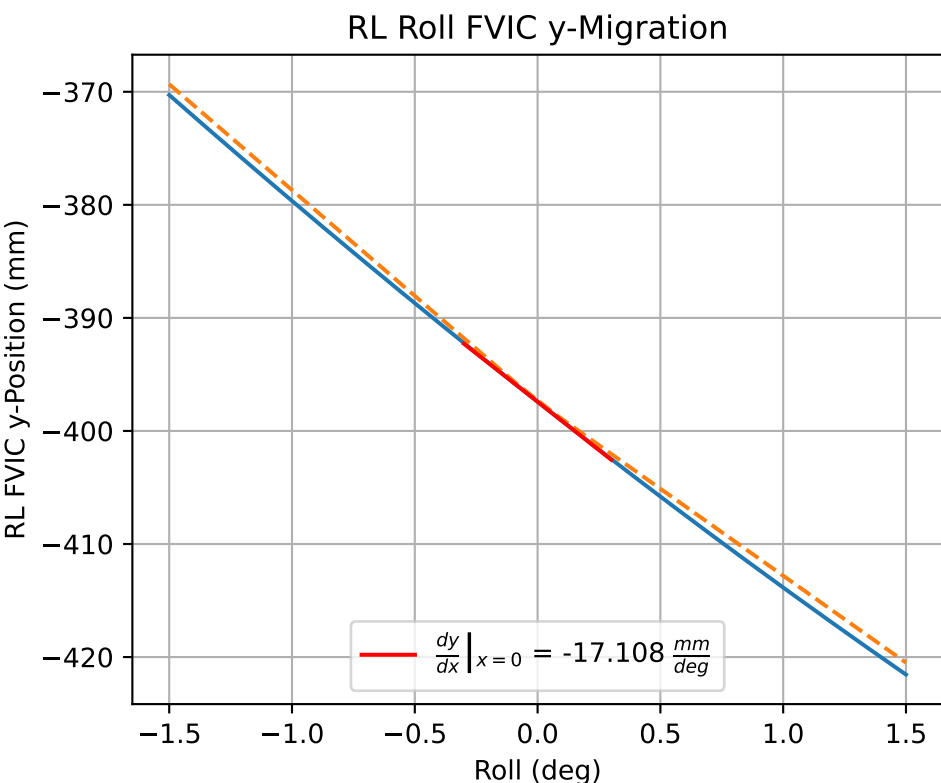
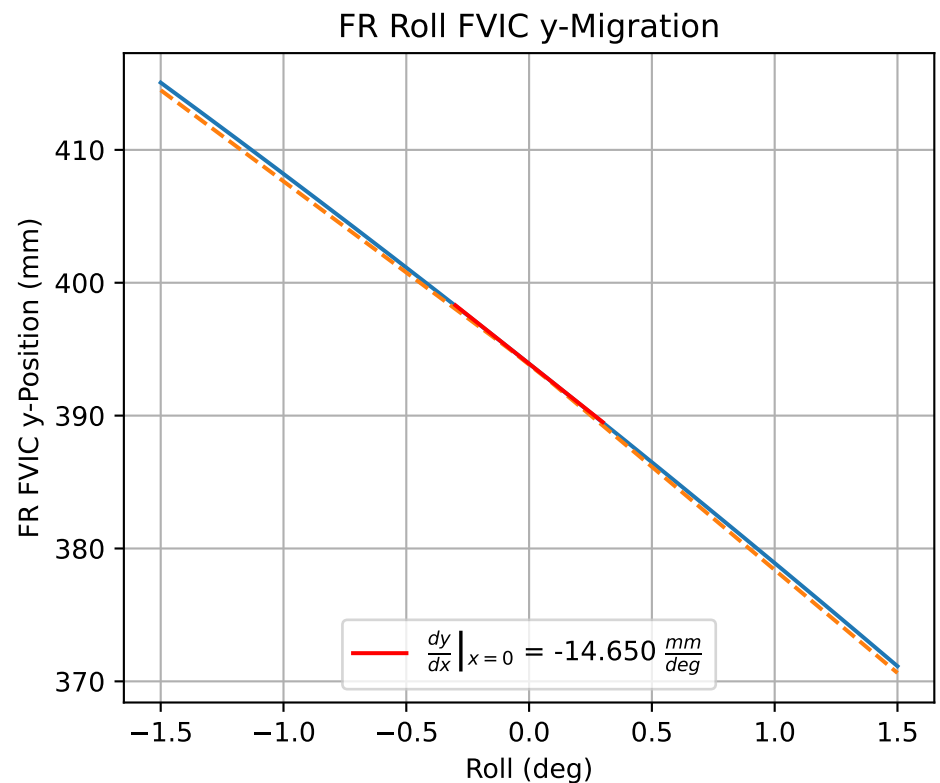
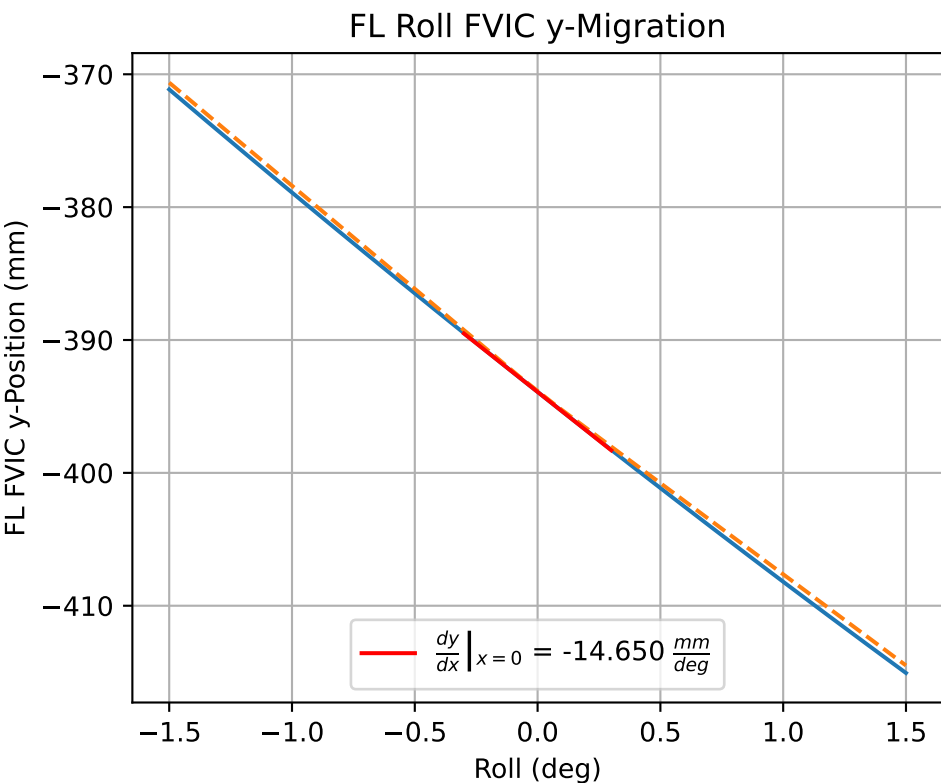
$$f(x) = a_1x + a_0$$

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

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	$f(x) = -0.0x^3 + -0.0x^2 + -0.013x + 13.593$



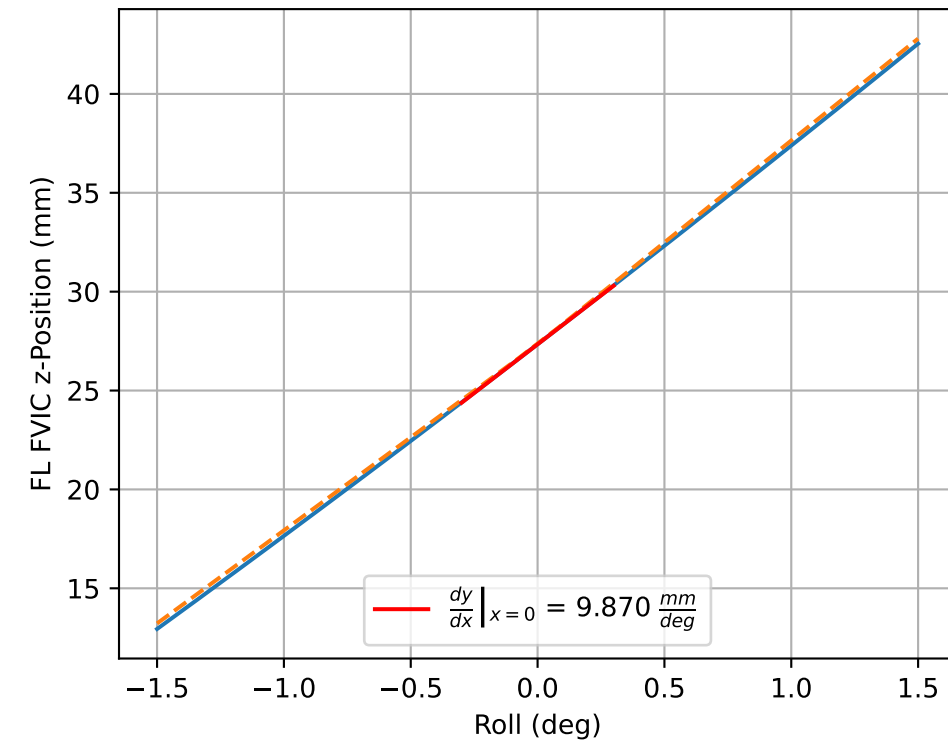
Full Model

FMU

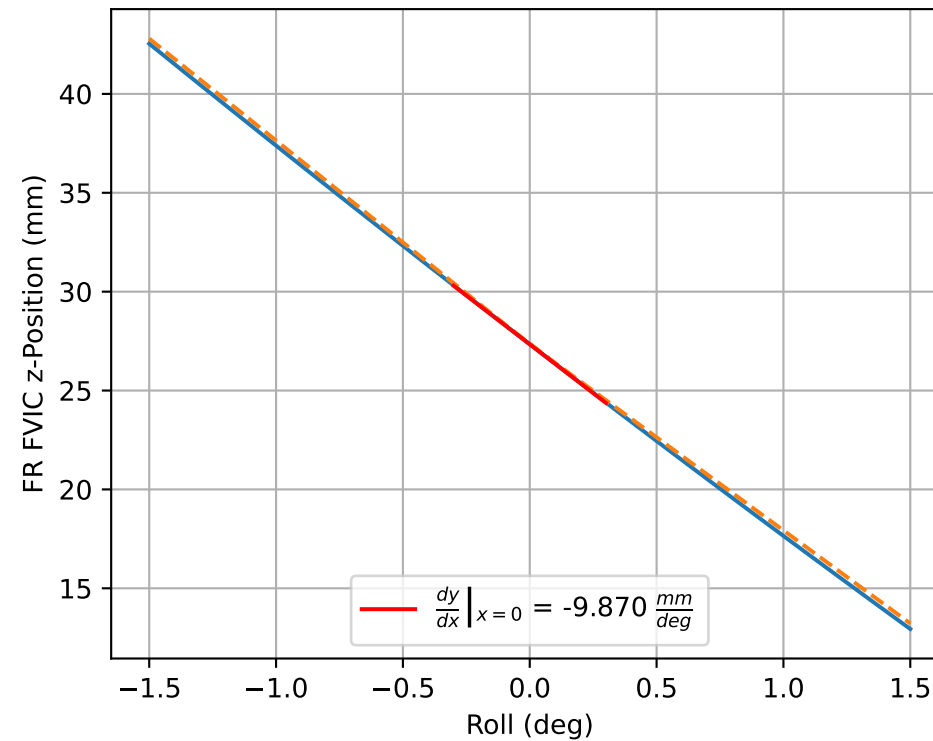
Linear Fit		$f(x) = a_1x + a_0$
FL	$f(x) = -14.65x + -393.907$	
FR	$f(x) = -14.65x + 393.907$	
RL	$f(x) = -17.108x + -397.417$	
RR	$f(x) = -17.108x + 397.417$	

Cubic Fit		$f(x) = a_3x^3 + a_2x^2 + a_1x + a_0$
FL	$f(x) = 0.005x^3 + 0.358x^2 + -14.65x + -393.907$	
FR	$f(x) = 0.005x^3 + -0.358x^2 + -14.65x + 393.907$	
RL	$f(x) = 0.009x^3 + 0.667x^2 + -17.108x + -397.417$	
RR	$f(x) = 0.009x^3 + -0.667x^2 + -17.108x + 397.417$	

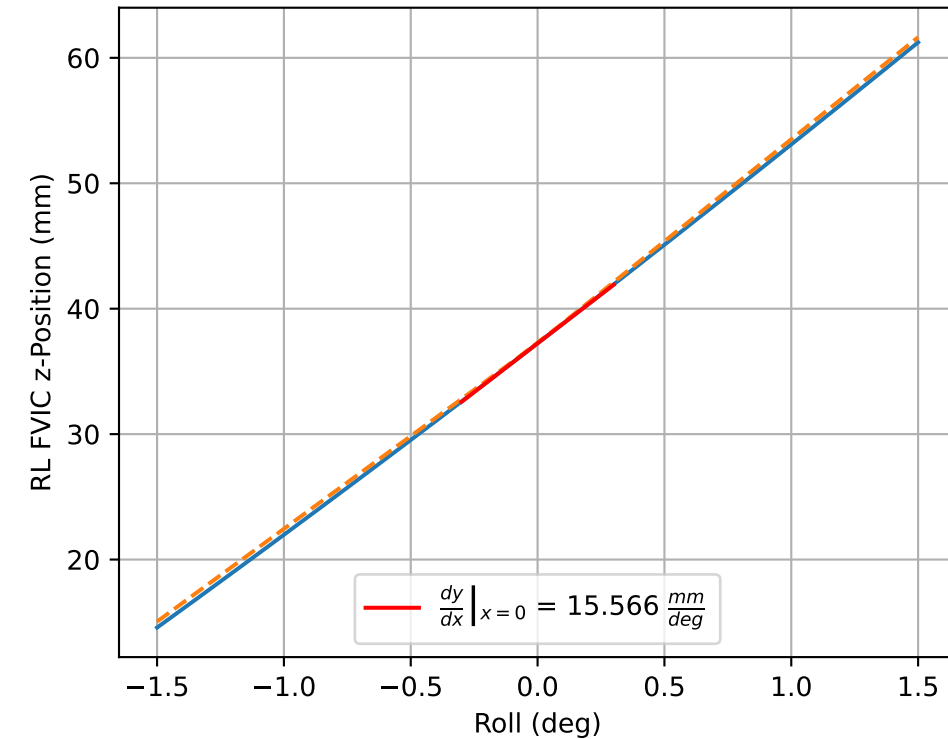
FL Roll FVIC z-Migration



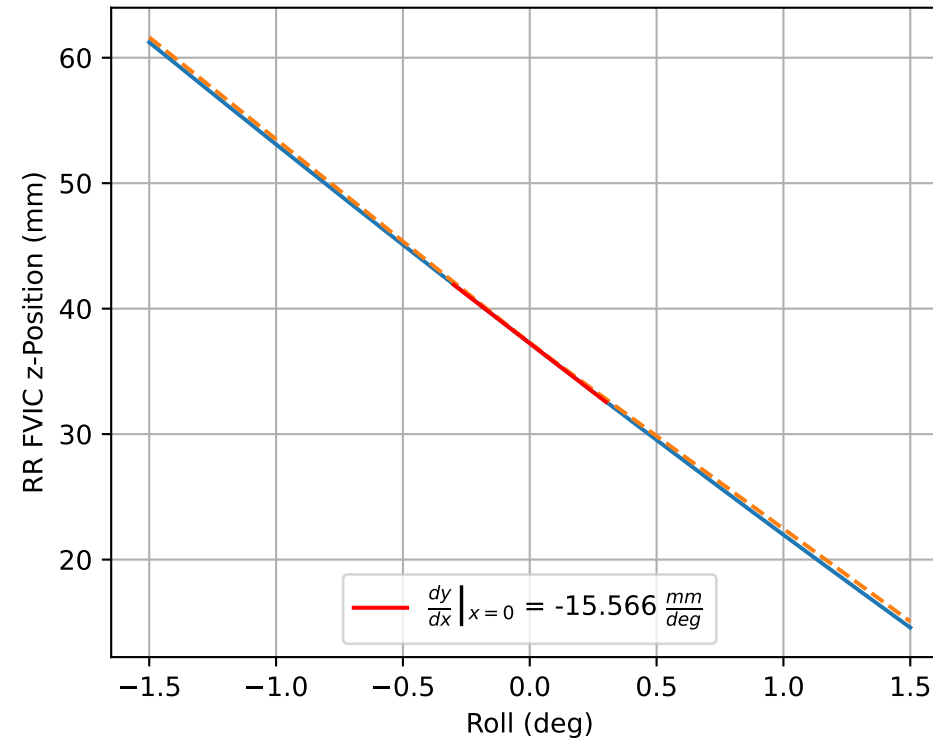
FR Roll FVIC z-Migration



RL Roll FVIC z-Migration



RR Roll FVIC z-Migration



— Full Model
- - - FMU

Linear Fit

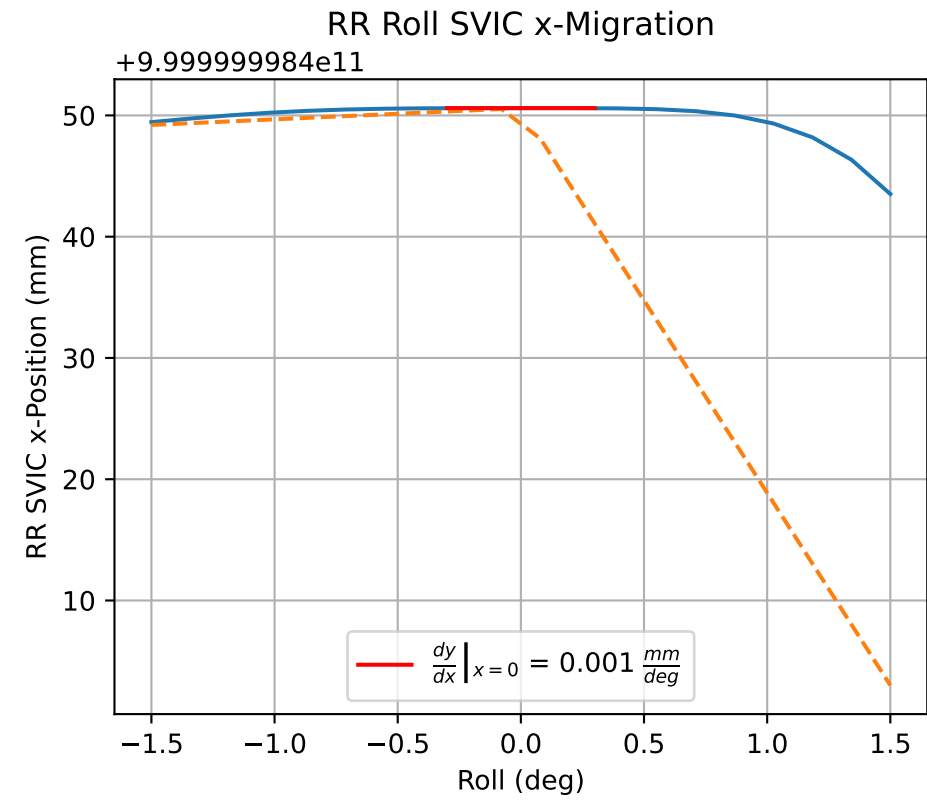
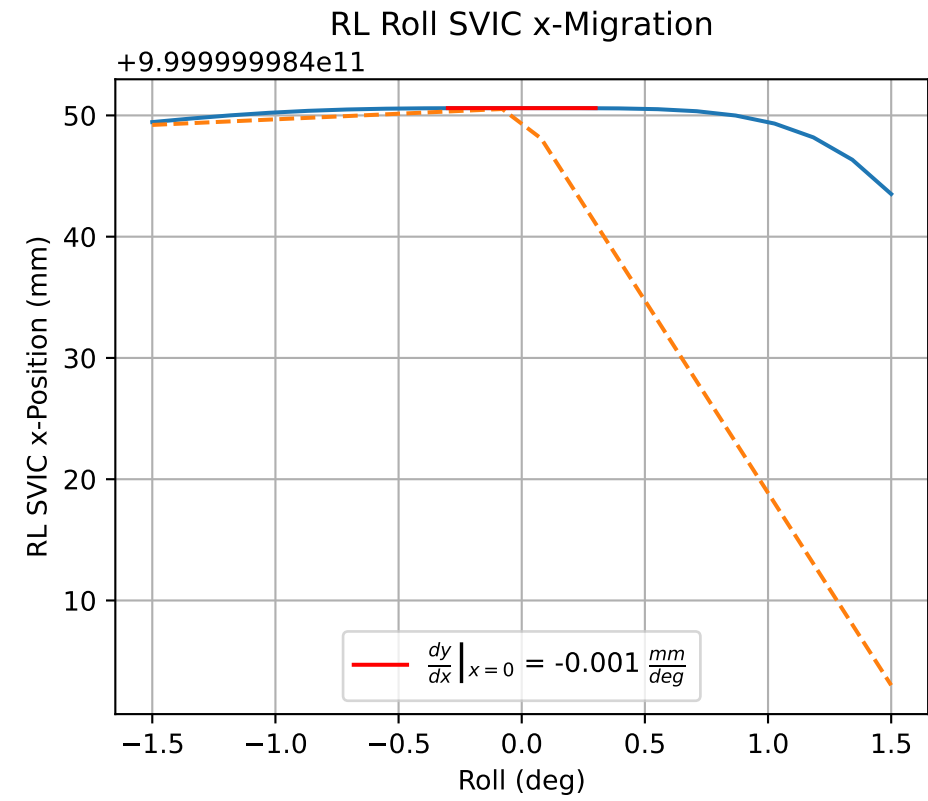
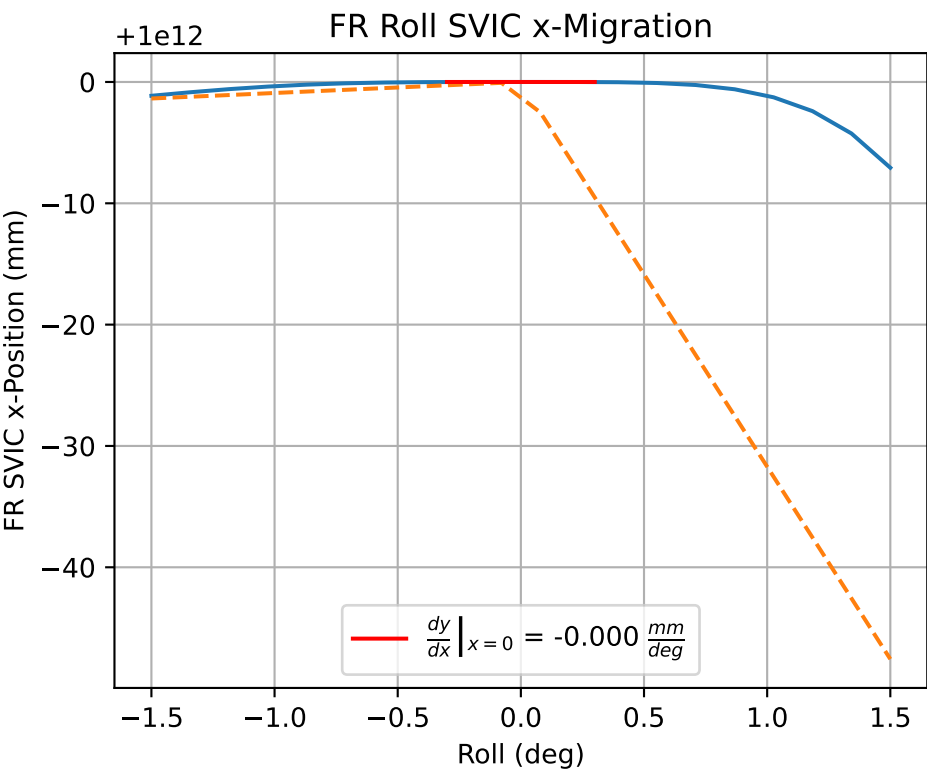
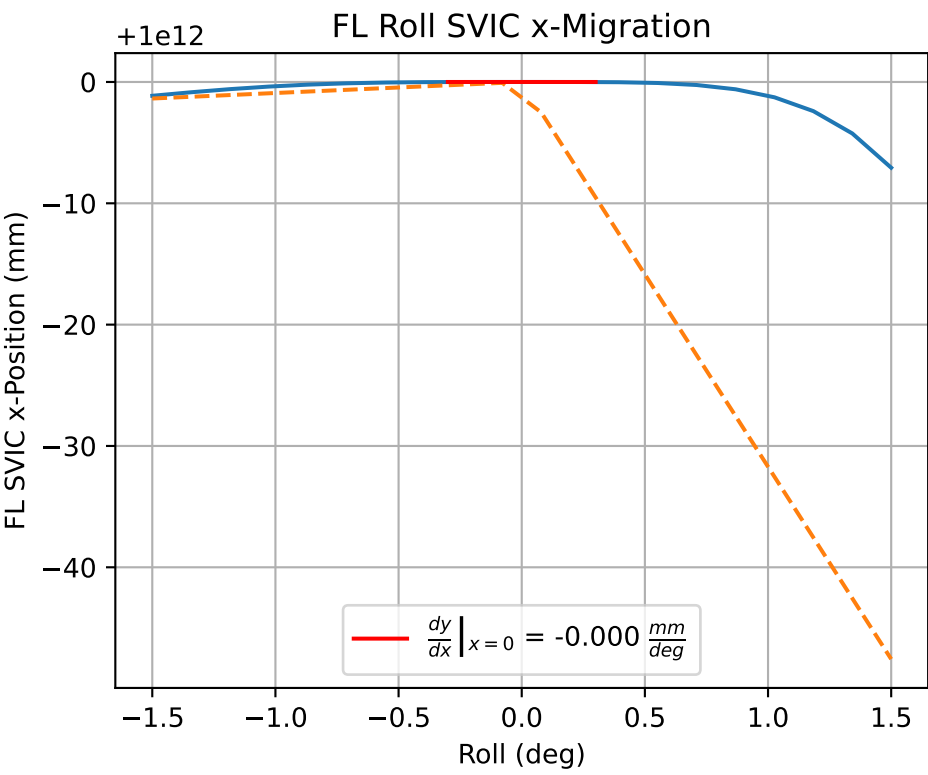
$$f(x) = a_1x + a_0$$

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

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	$f(x) = 0.007x^3 + 0.296x^2 - 15.566x + 37.239$

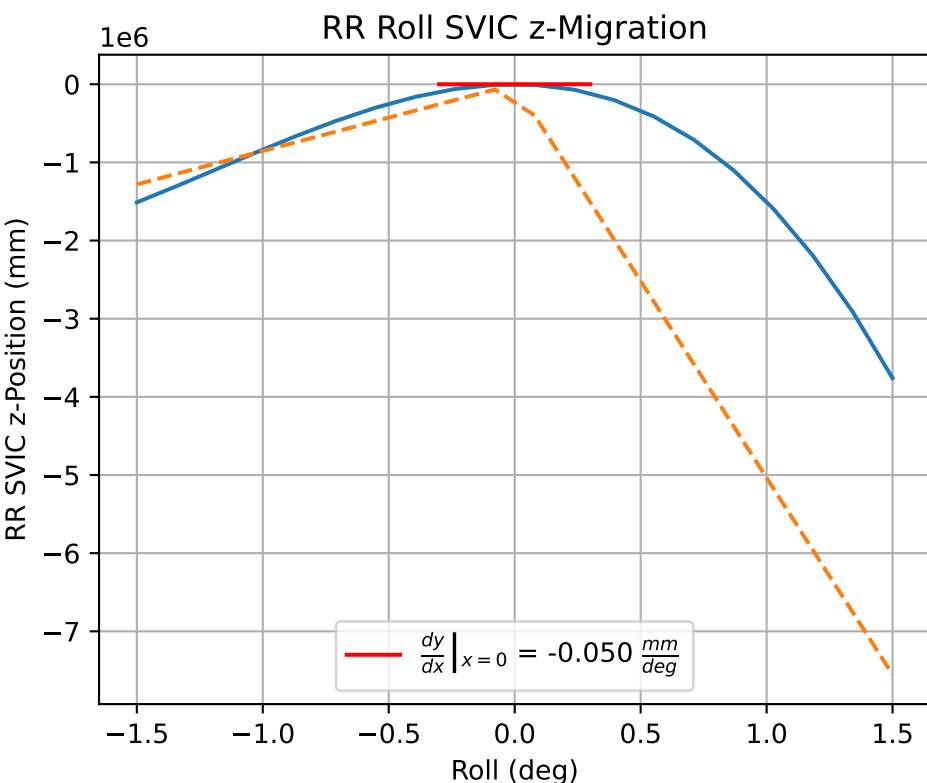
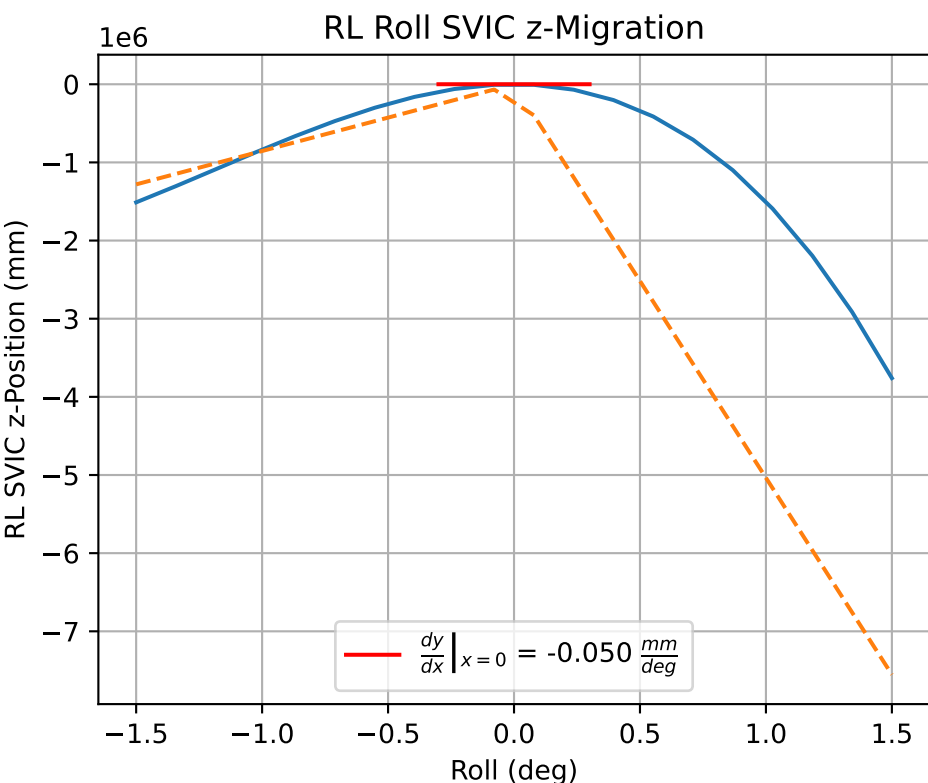
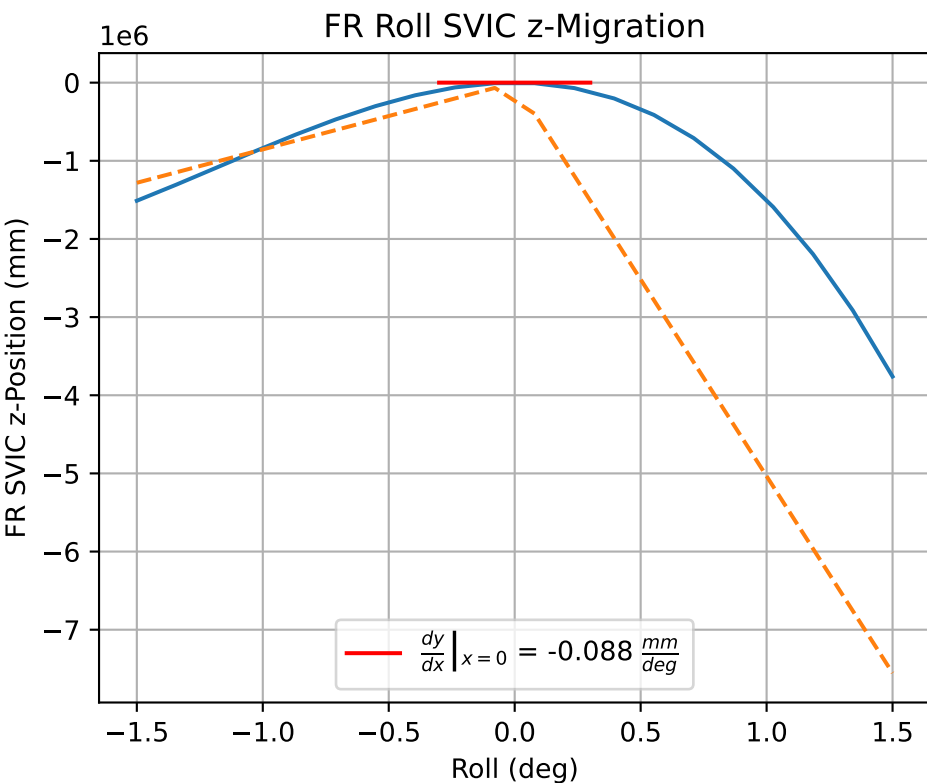
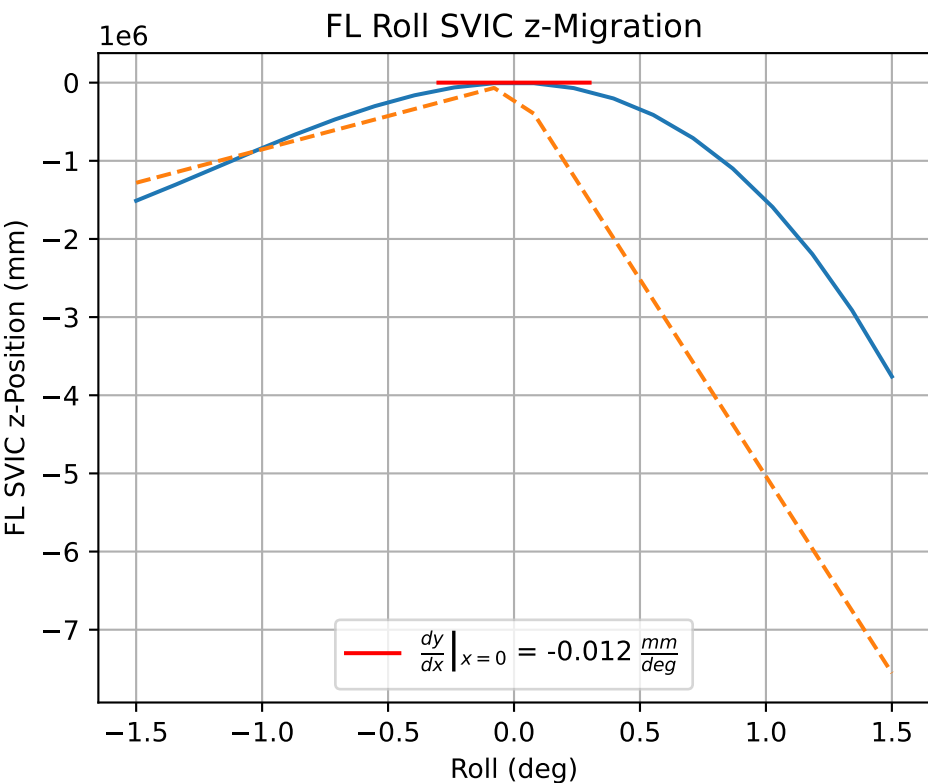


Linear Fit $f(x) = a_1x + a_0$

FL	$f(x) = -0.0x + 1.000e+12$
FR	$f(x) = -0.0x + 1.000e+12$
RL	$f(x) = -0.001x + 1.000e+12$
RR	$f(x) = 0.001x + 1.000e+12$

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

FL	$f(x) = -1.062x^3 + -1.689x^2 + 0.555x + 1.0e+12$
FR	$f(x) = -1.062x^3 + -1.689x^2 + 0.555x + 1.0e+12$
RL	$f(x) = -1.062x^3 + -1.695x^2 + 0.555x + 1.0e+12$
RR	$f(x) = -1.062x^3 + -1.695x^2 + 0.556x + 1.0e+12$



Linear Fit

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

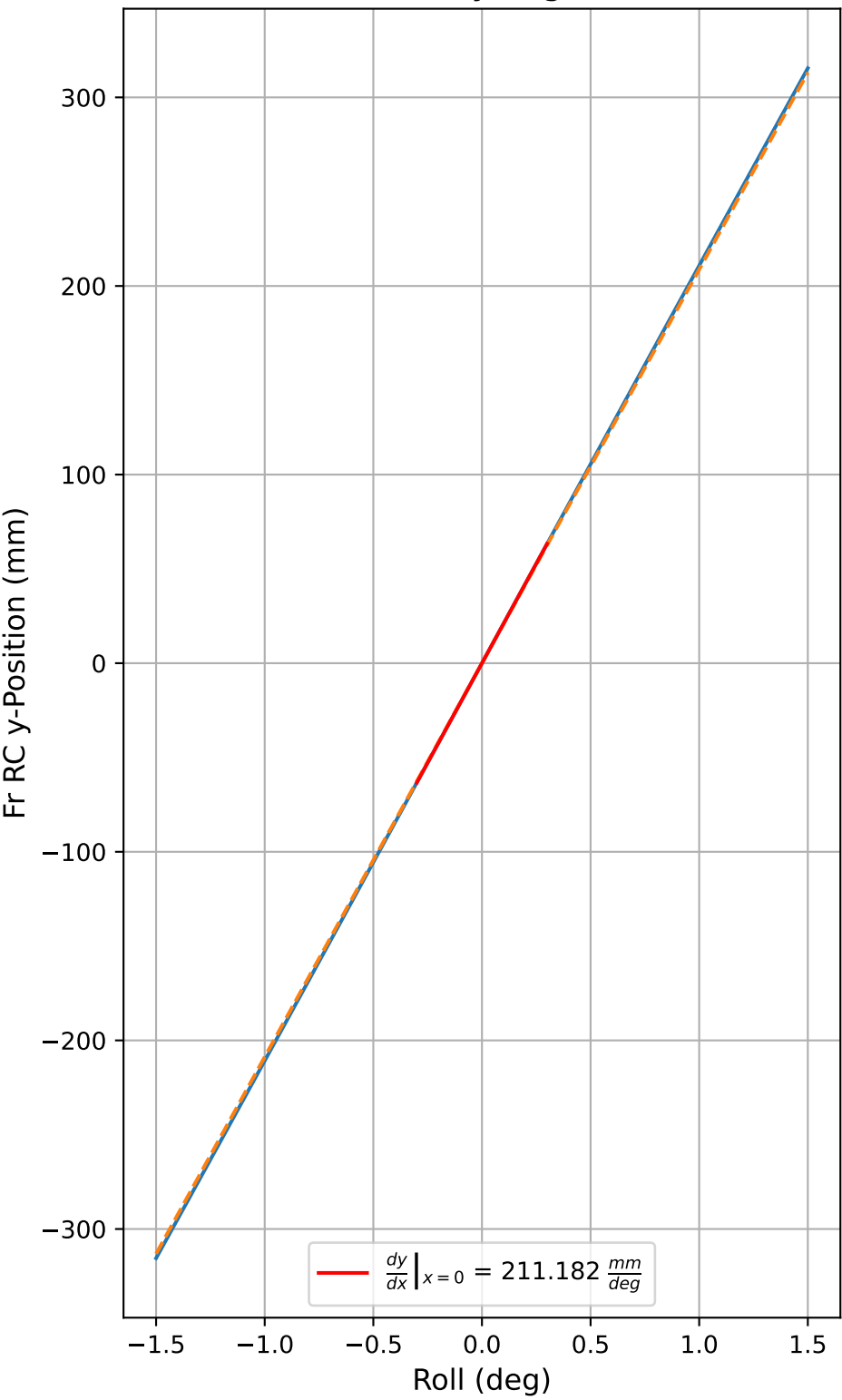
FL	$f(x) = -0.012x + 203.231$
FR	$f(x) = -0.088x + 203.231$
RL	$f(x) = -0.05x + 203.262$
RR	$f(x) = -0.05x + 203.262$

Cubic Fit

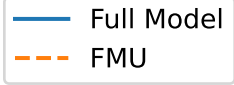
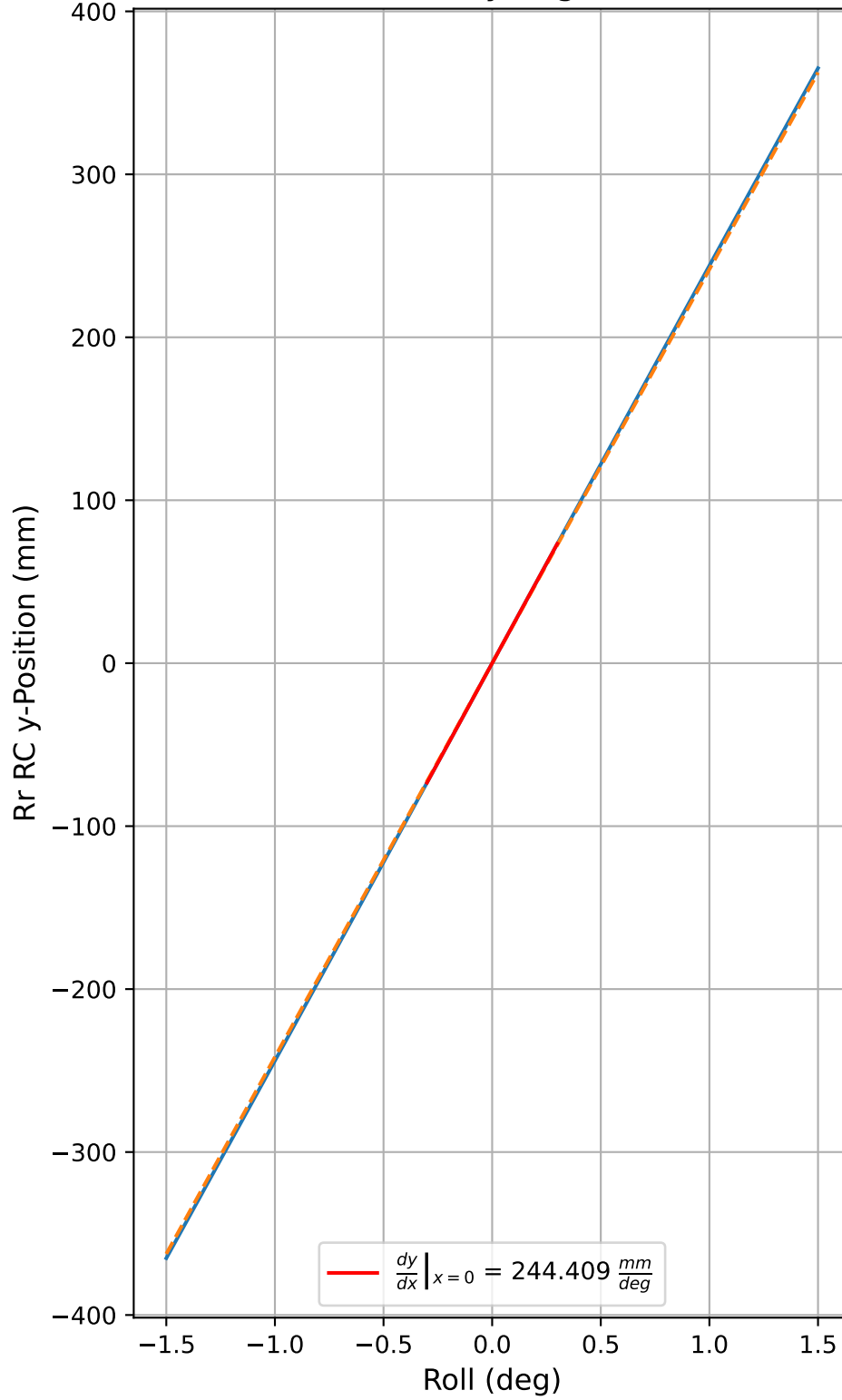
$$f(x) = a_3x^3 + a_2x^2 + a_1x + a_0$$

FL	$f(x) = -333350.204x^3 + -1171318.784x^2 + 473.537x + 1.000$
FR	$f(x) = -333350.204x^3 + -1171318.784x^2 + 473.462x + 1.000$
RL	$f(x) = -333350.204x^3 + -1171318.784x^2 + 473.499x + 1.000$
RR	$f(x) = -333350.203x^3 + -1171318.784x^2 + 473.499x + 1.000$

Fr Roll RC y-Migration



Rr Roll RC y-Migration



Linear Fit

$f(x) = a_1x + a_0$

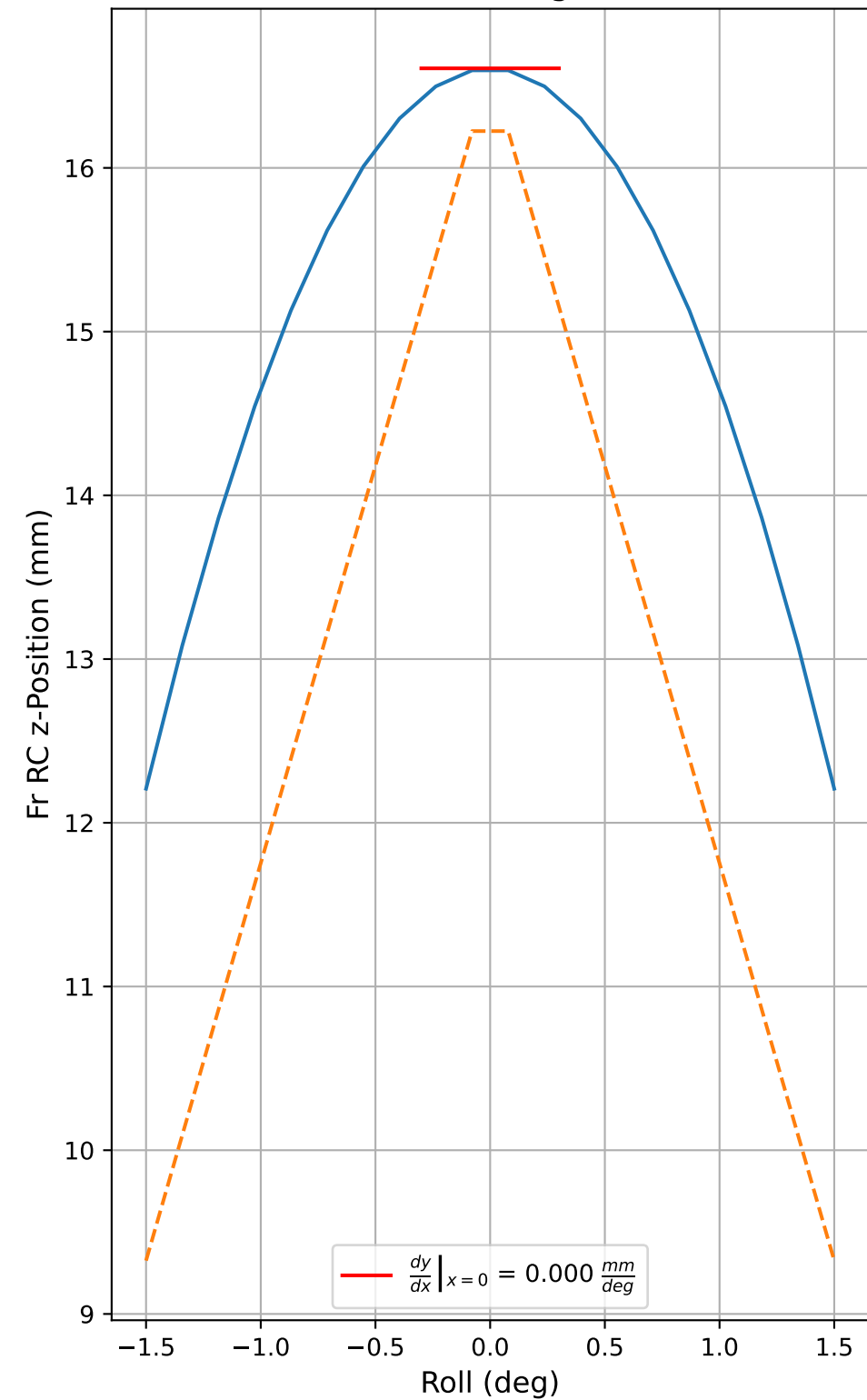
Fr	$f(x) = 211.182x + -0.0$
Rr	$f(x) = 244.409x + 0.0$

Cubic Fit

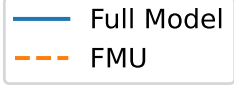
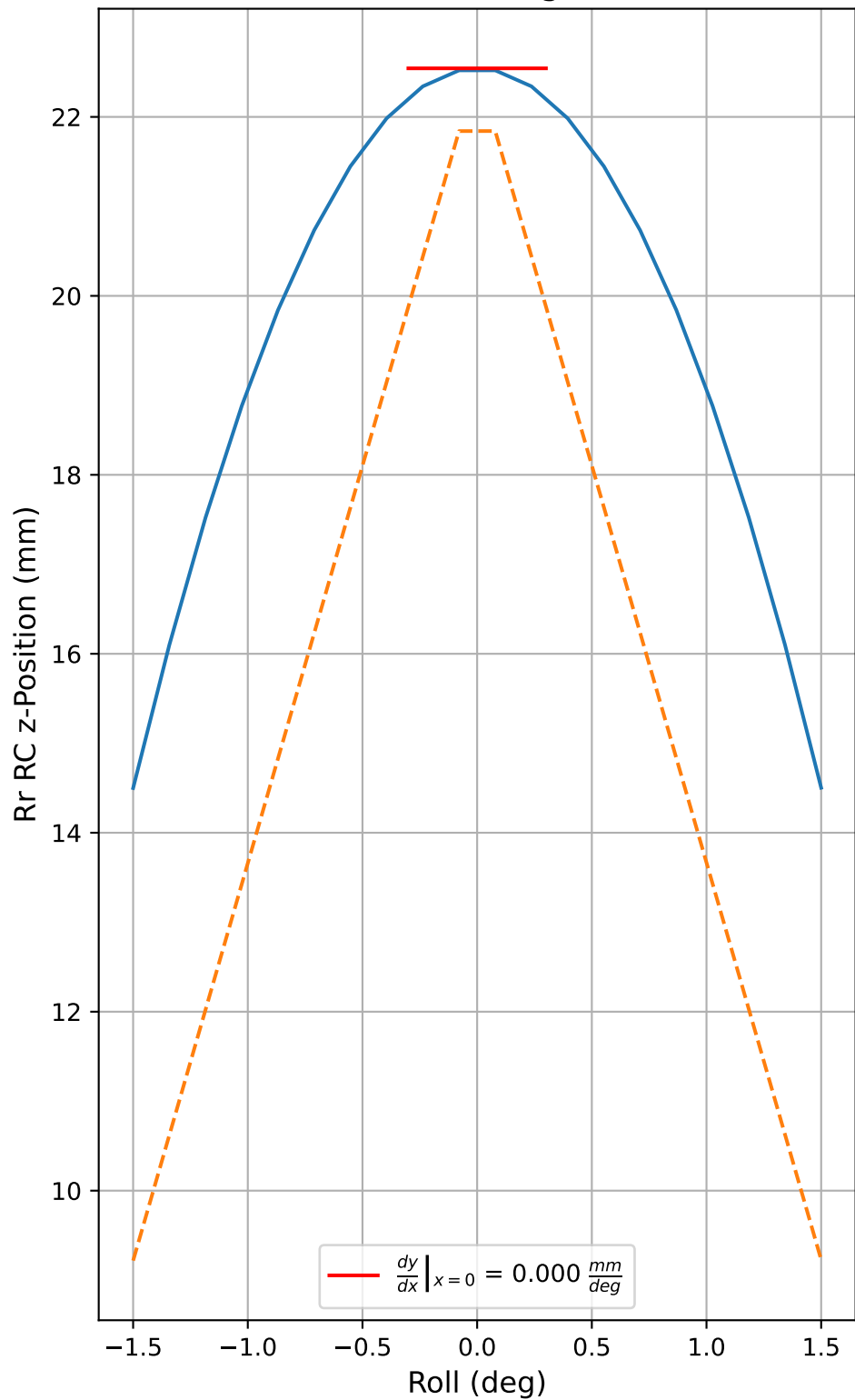
$f(x) = a_3x^3 + a_2x^2 + a_1x + a_0$

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

Fr Roll RC z-Migration



Rr Roll RC z-Migration



Linear Fit

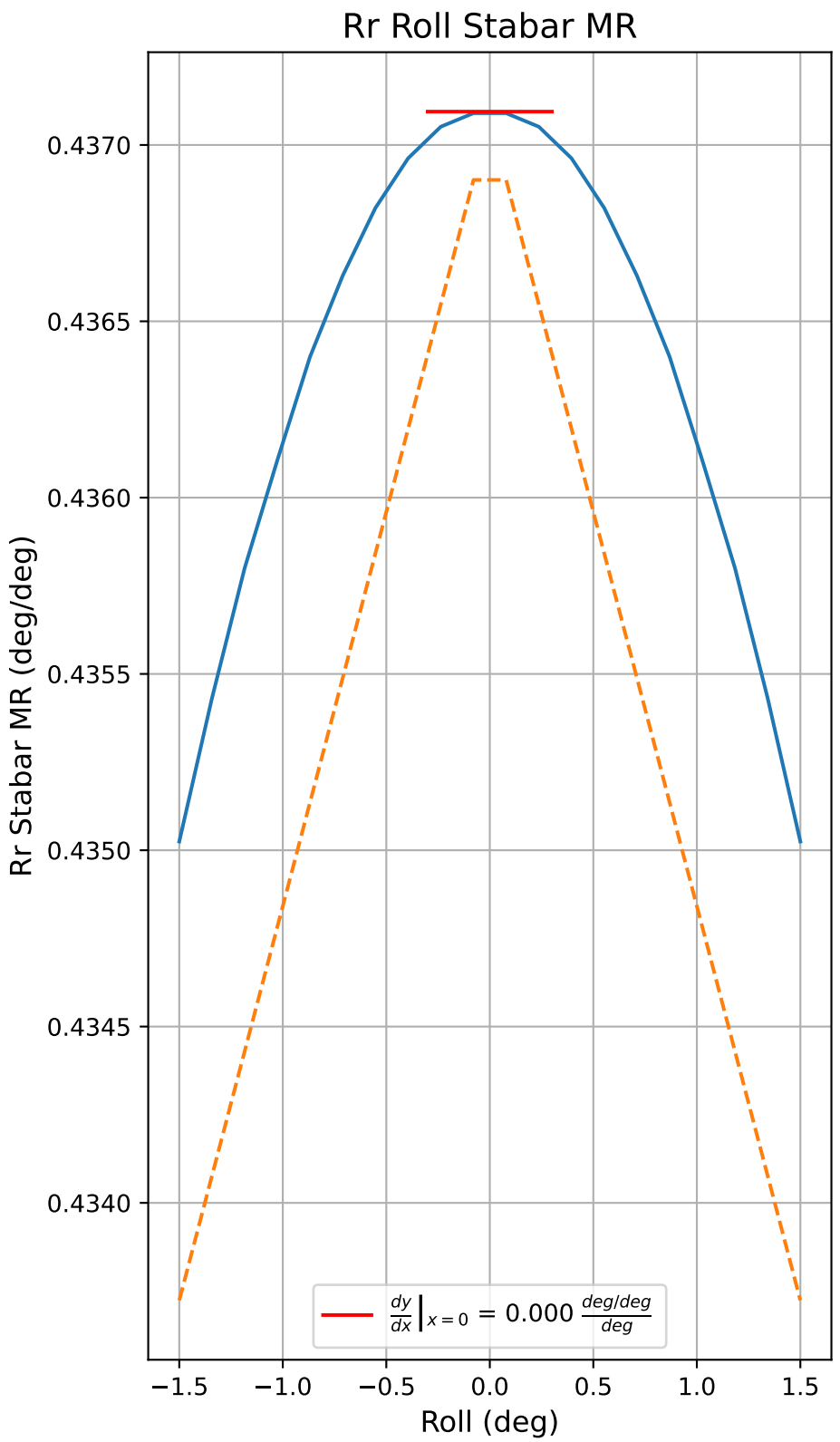
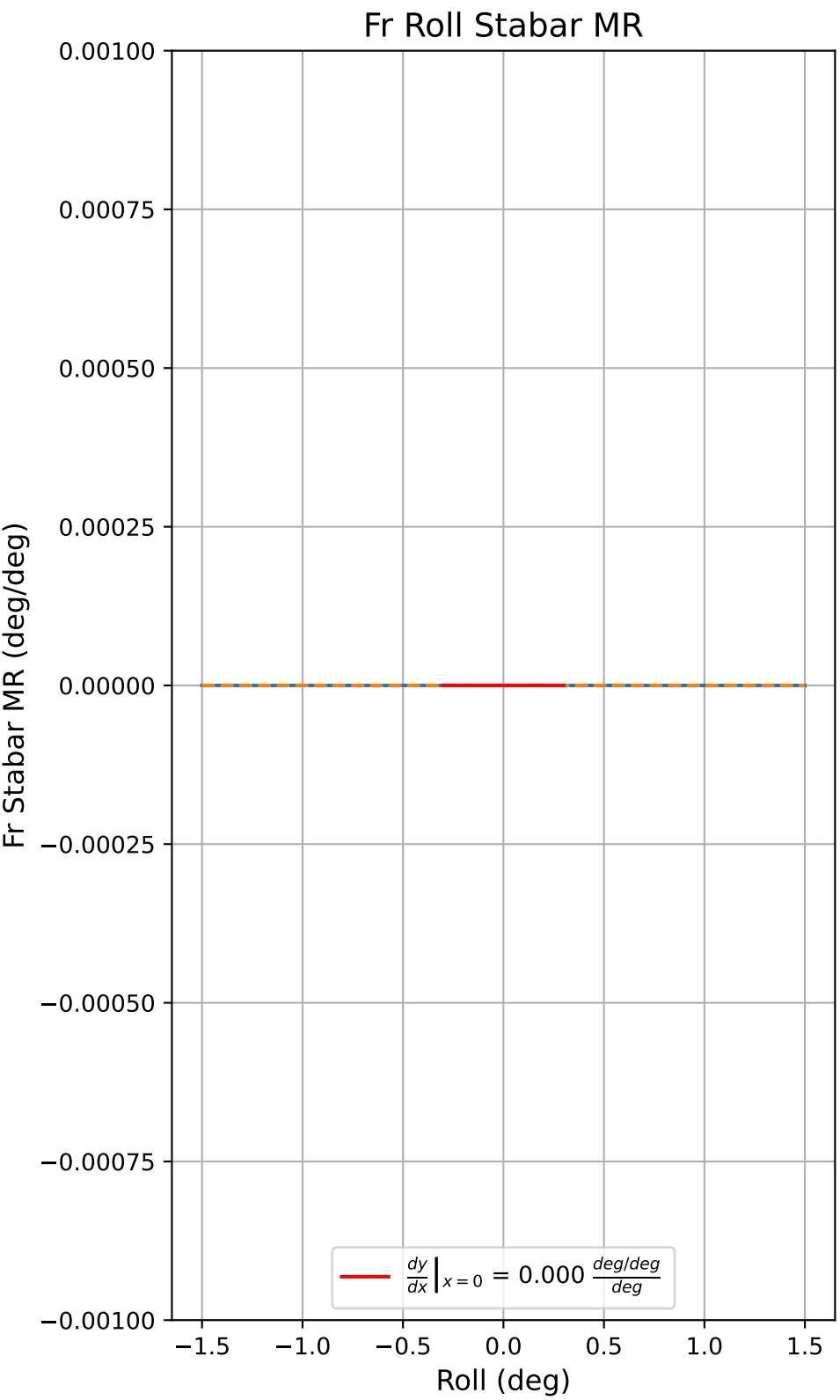
$$f(x) = a_1x + a_0$$

Fr	$f(x) = 0.0x + 16.608$
Rr	$f(x) = 0.0x + 22.543$

Cubic Fit

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

Fr	$f(x) = 0.0x^3 + -1.956x^2 + -0.0x + 16.606$
Rr	$f(x) = 0.001x^3 + -3.575x^2 + -0.0x + 22.54$



Full Model

FMU

Linear Fit

$f(x) = a_1x + a_0$

Fr	$f(x) = 0.0x + 0.0$
Rr	$f(x) = 0.0x + 0.437$

Cubic Fit

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

Fr	$f(x) = 0.0x^3 + 0.0x^2 + 0.0x + 0.0$
Rr	$f(x) = 0.0x^3 + -0.001x^2 + -0.0x + 0.437$