# Vehicle Dynamics and Control – Longitudinal Dynamics Lab

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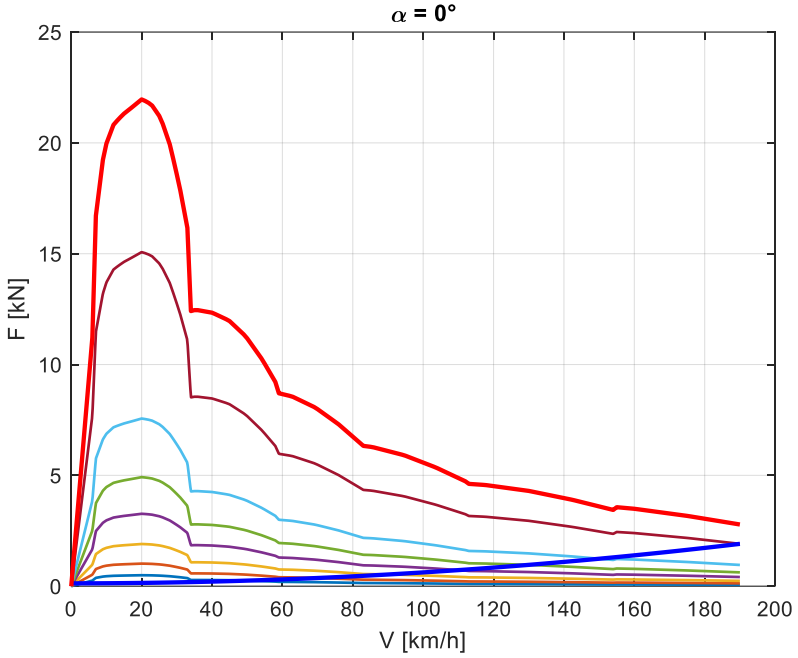
*Car segment: pickup*

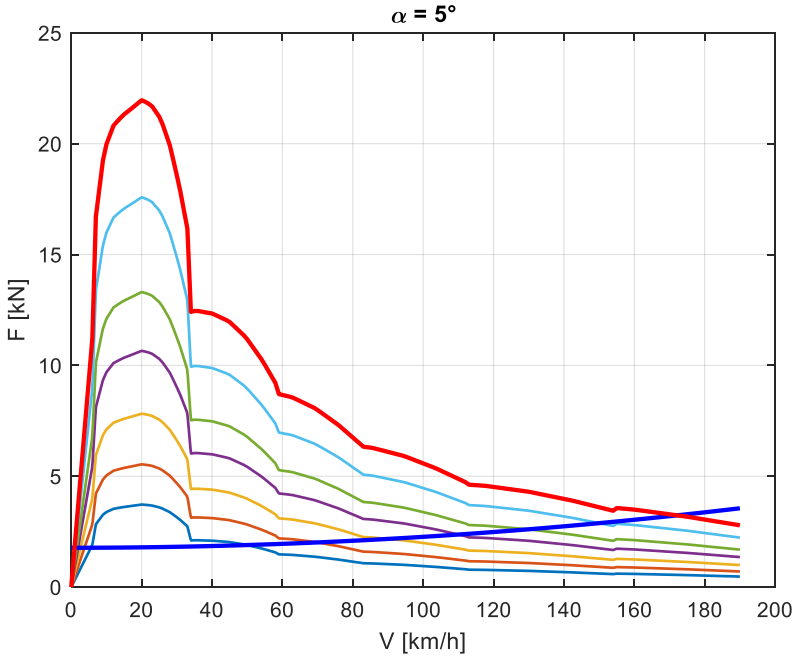
## Contents

# 1. Motor working point

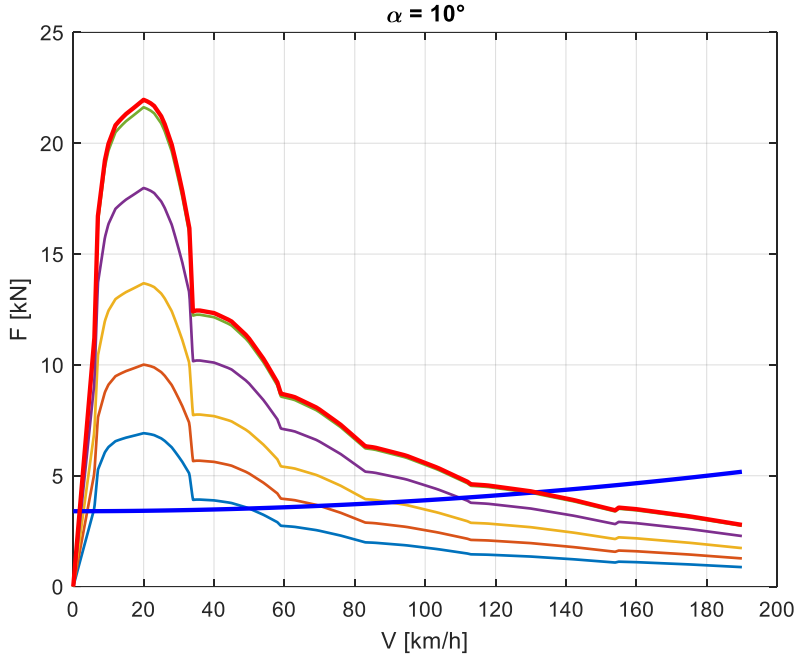
$\alpha = 0°$



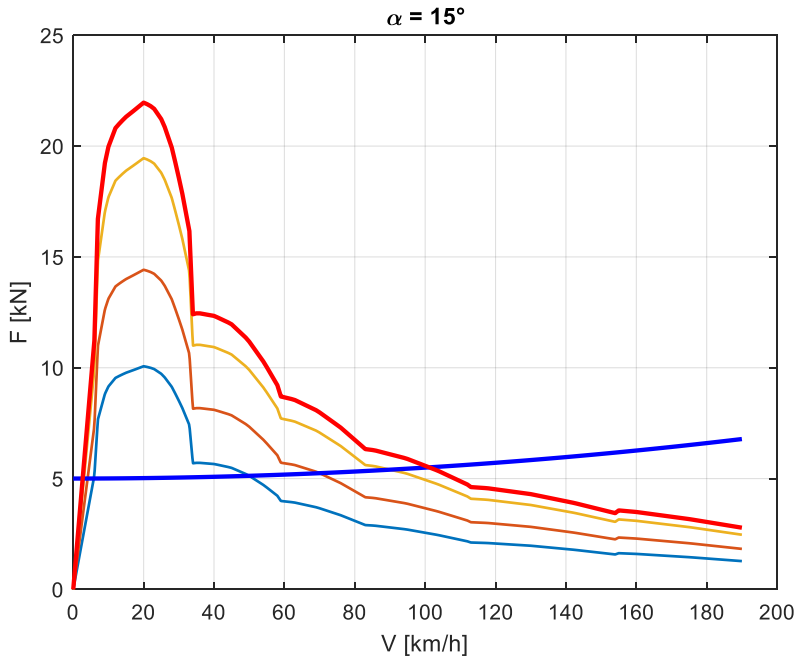

$\alpha = 5°$



## $\alpha = 10°$




## $\alpha = 15°$

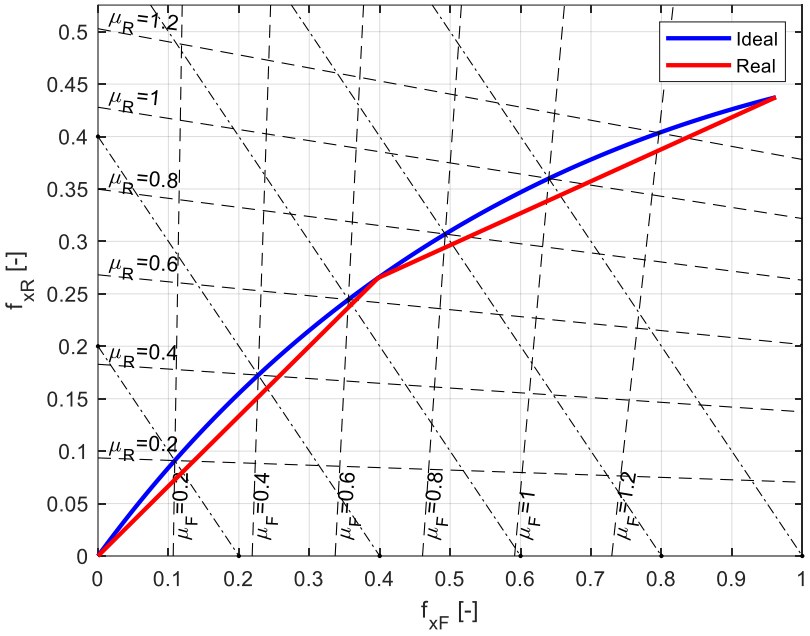


## Working points

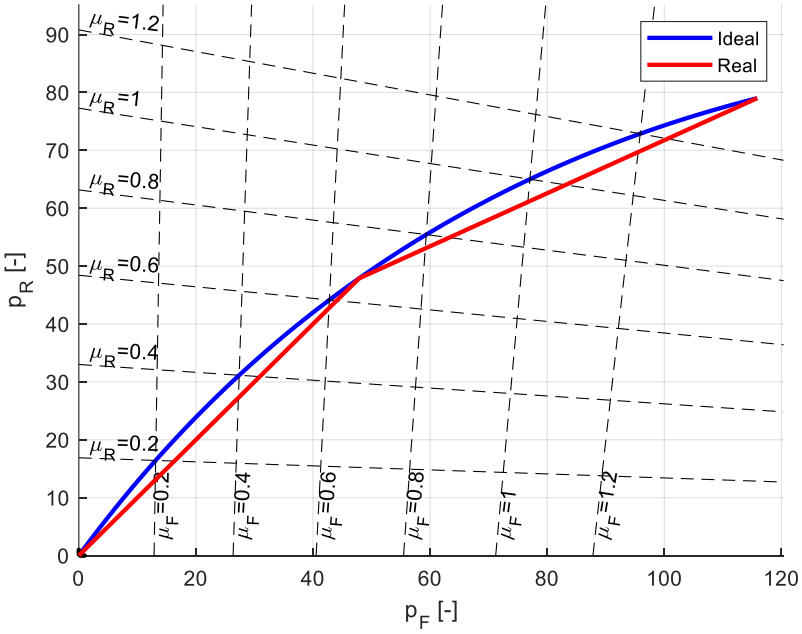
| $\alpha[°]$ | $v_x[km/h]$ | $F_x[kN]$ | $\gamma[\%]$ |
|---|---|---|---|
| 0.000 | 50.000 | 0.252 | 0.023 |
| 0.000 | 70.000 | 0.371 | 0.046 |
| 0.000 | 90.000 | 0.529 | 0.087 |
| 0.000 | 110.000 | 0.726 | 0.149 |
| 0.000 | 130.000 | 0.963 | 0.224 |
| 0.000 | 150.000 | 1.239 | 0.344 |
| 0.000 | 190.000 | 1.911 | 0.686 |
| 5.000 | 50.000 | 1.894 | 0.169 |
| 5.000 | 70.000 | 2.012 | 0.252 |
| 5.000 | 90.000 | 2.170 | 0.356 |
| 5.000 | 110.000 | 2.368 | 0.485 |
| 5.000 | 130.000 | 2.605 | 0.606 |
| 5.000 | 150.000 | 2.881 | 0.801 |
| 5.000 | 172.136 | 3.553 | 1.000 |
| 10.000 | 50.000 | 3.523 | 0.315 |
| 10.000 | 70.000 | 3.641 | 0.456 |
| 10.000 | 90.000 | 3.799 | 0.623 |
| 10.000 | 110.000 | 3.996 | 0.819 |
| 10.000 | 130.000 | 4.233 | 0.985 |
| 10.000 | 150.000 | 4.510 | NaN |
| 10.000 | 131.455 | 5.181 | 1.000 |
| 15.000 | 50.000 | 5.125 | 0.458 |
| 15.000 | 70.000 | 5.125 | 0.657 |
| 15.000 | 90.000 | 5.402 | 0.886 |
| 15.000 | 110.000 | 5.599 | NaN |
| 15.000 | 130.000 | 5.836 | NaN |
| 15.000 | 150.000 | 6.112 | NaN |
| 15.000 | 101.147 | 6.784 | 1.000 |

# 2. Brake distribution

## a. Front-Rear force distribution

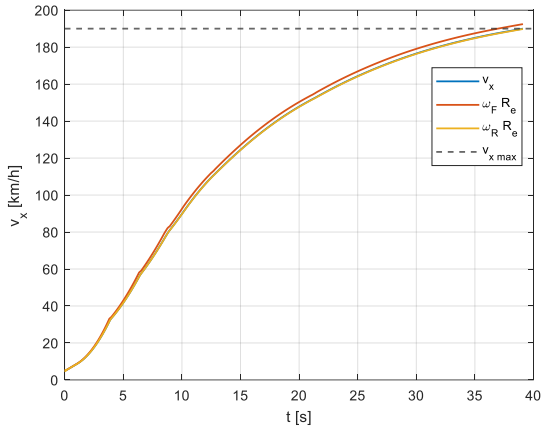


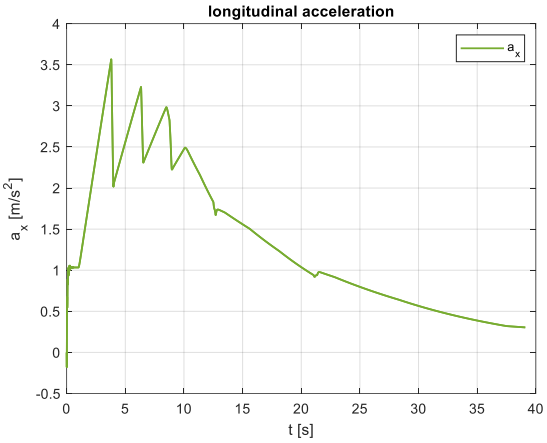

## b. Front-Rear pressure distribution

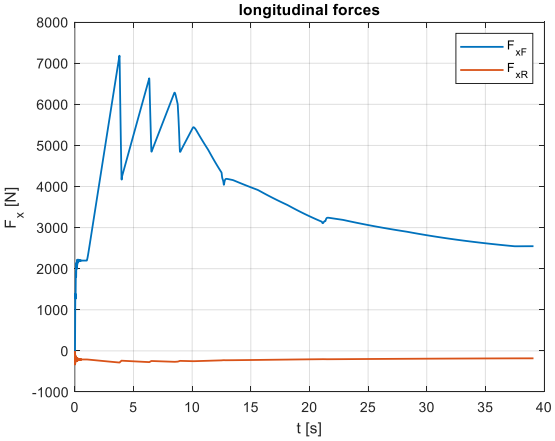


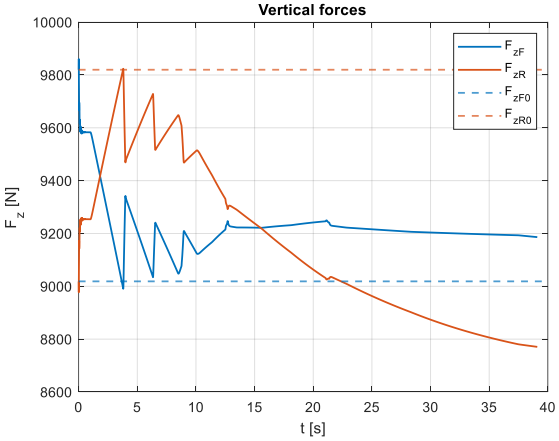

| | |
|---|---|
| **$P_{dis}$** | 47.88 [bar] |
| **$m_{dis}$** | 0.4577 |

# 3. Straight line acceleration maneuver



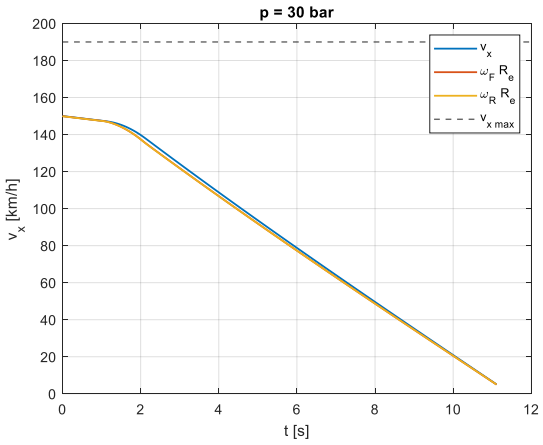



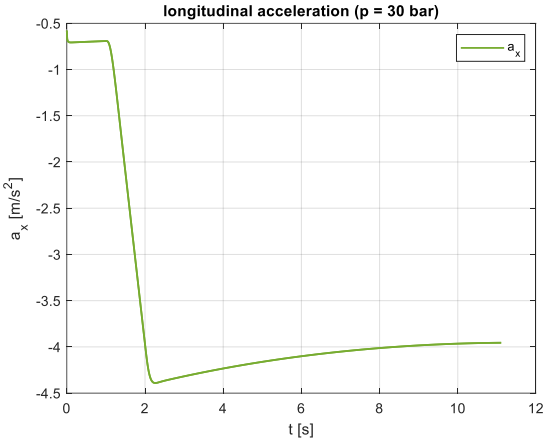



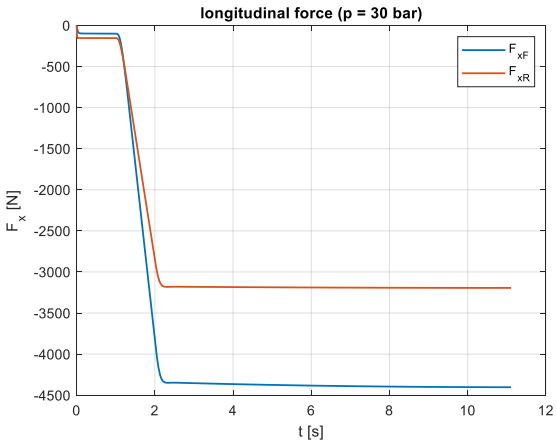



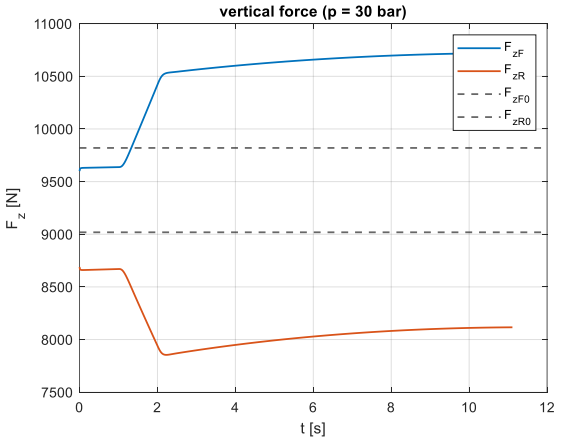
# 4. Straight line braking maneuver

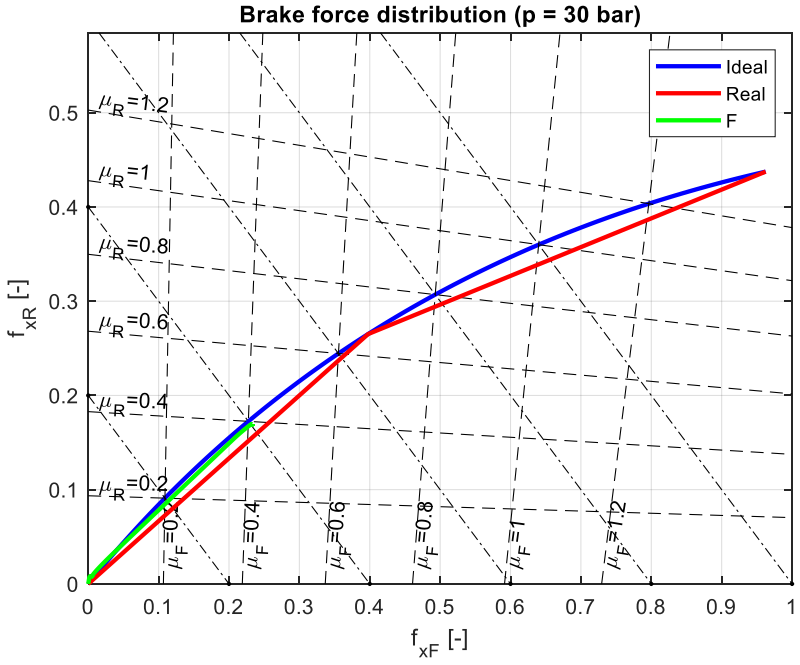
## a. Brake pressure: 30 bar



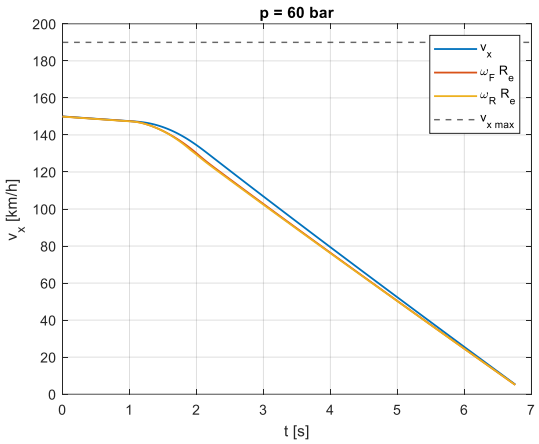



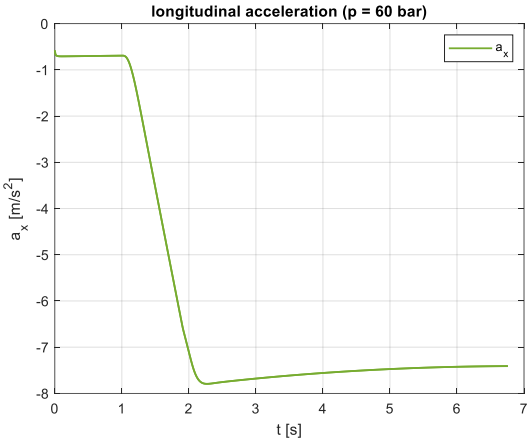



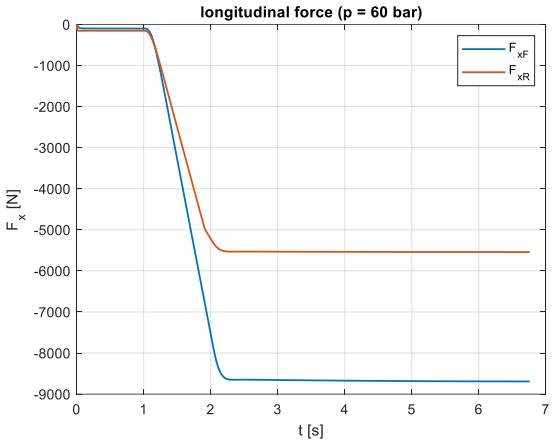



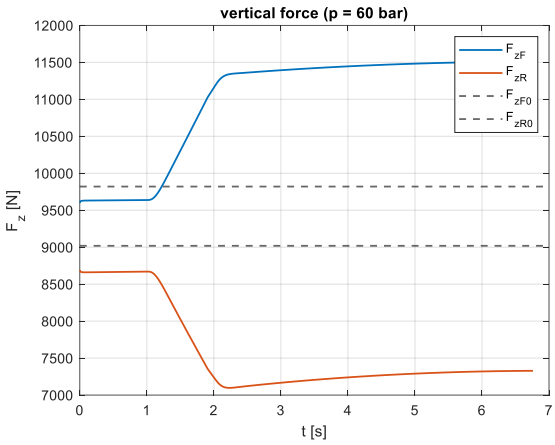



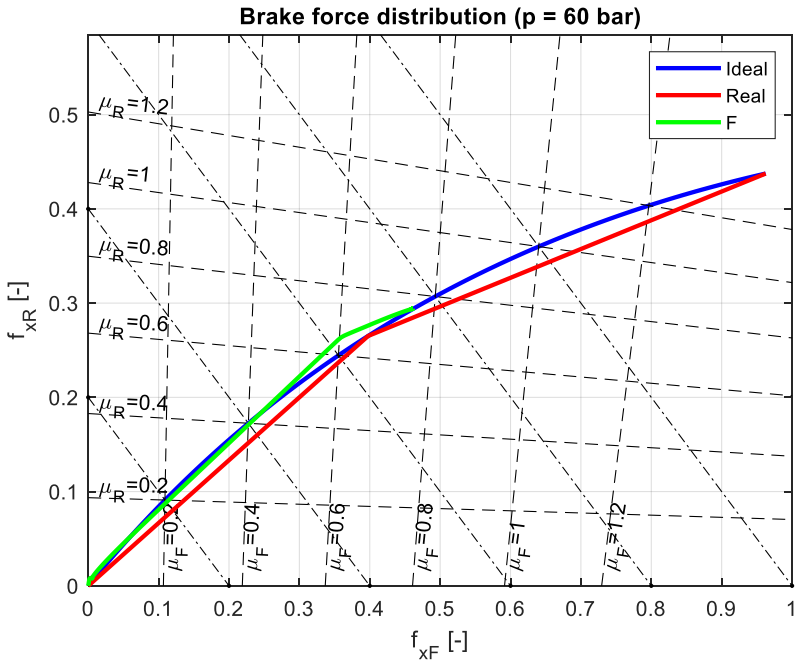
## b. Brake pressure: 60 bar



## c. Brake pressure: 90 bar