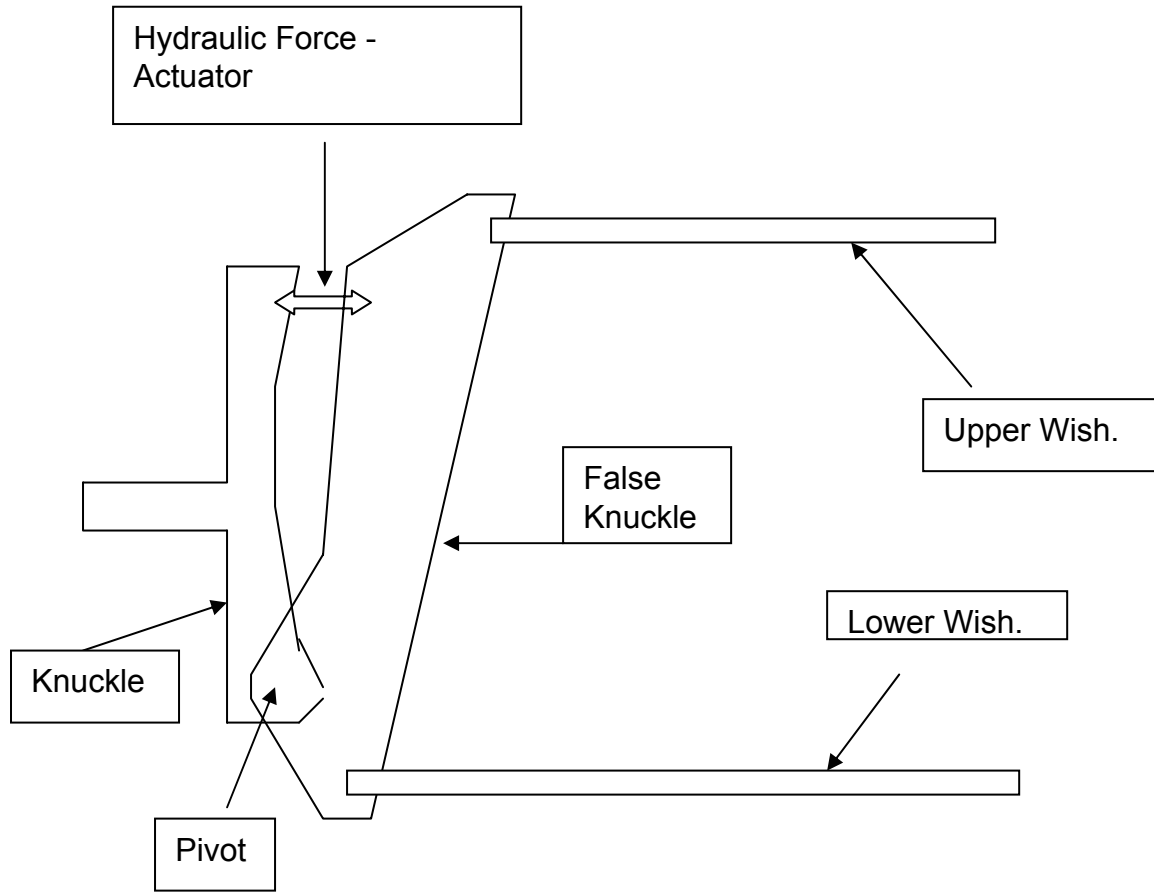


ACTIVE CAMBER

- COVENTRY UNIVERSITY
- MSc AUTOMOTIVE ENGINEERING
- TUTOR: Dr. Mike Blundell
Dr. Sergio Rinland
- STUDENT: Pablo Cangini
- MAY 9, 2006

DEVICE



SLIDE FORCES GENERATION

SLIDE FORCES GENERATION

- $Y = C \cdot \alpha$

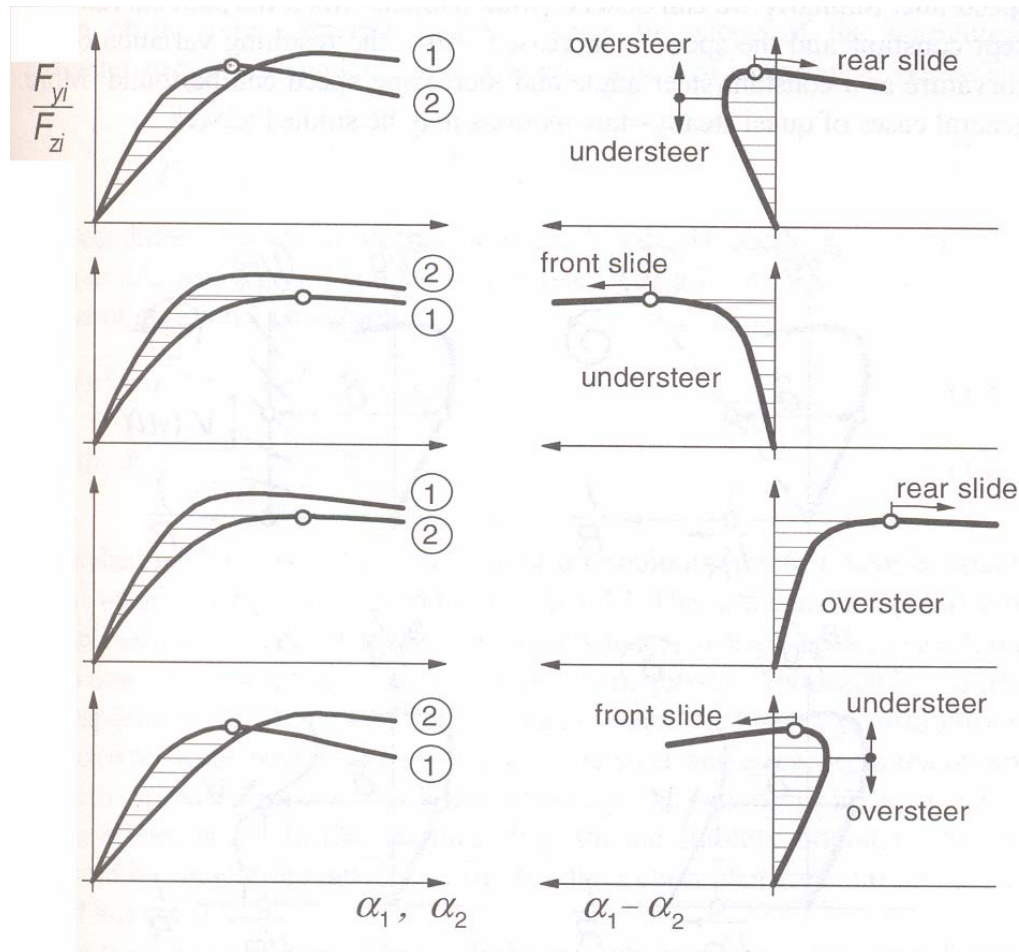
SLIDE FORCES GENERATION

- $Y = C \cdot \alpha$
- $Y = C\alpha \cdot \alpha + C\gamma \cdot \gamma$

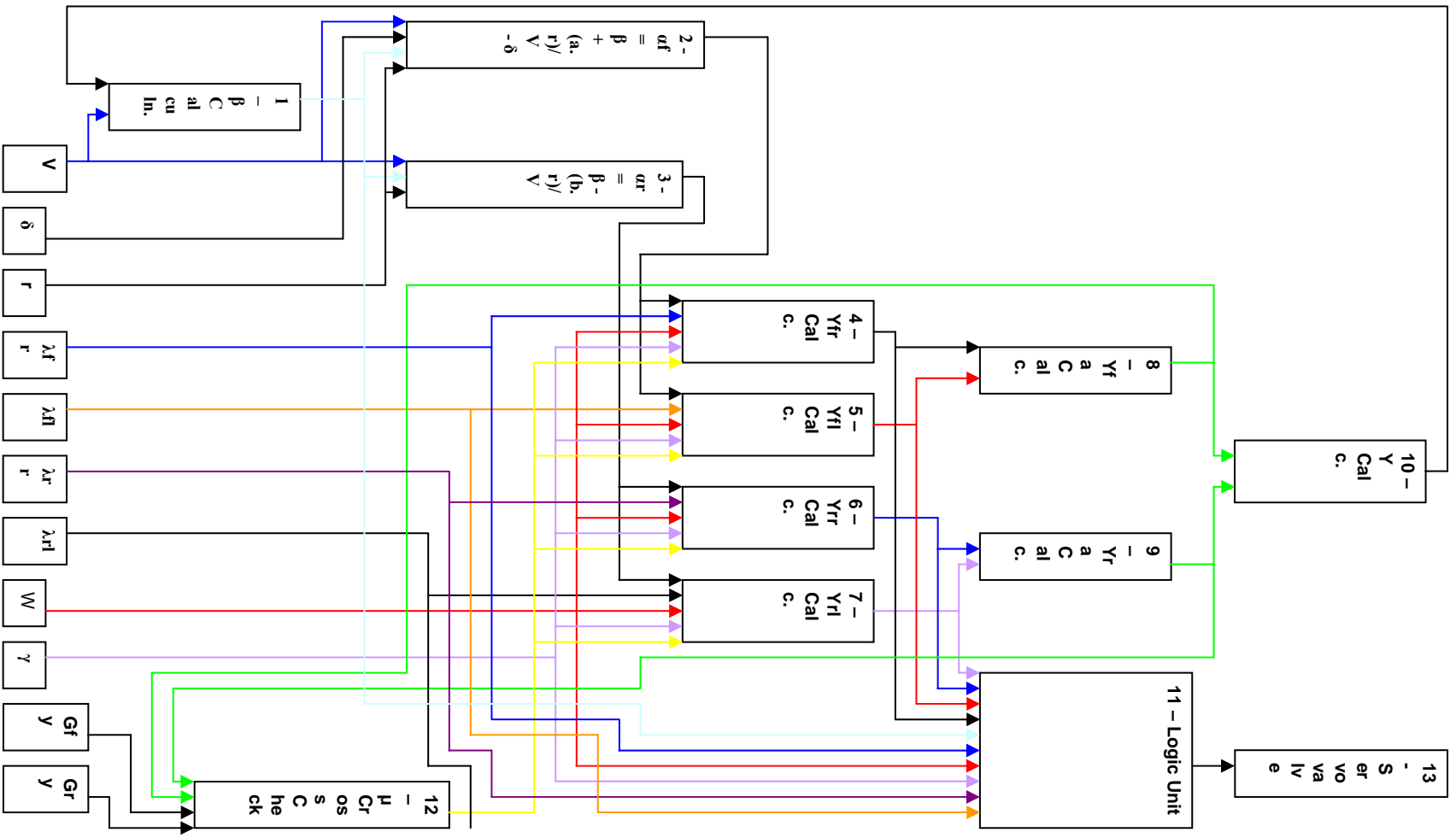
SLIDE FORCES GENERATION

- $Y = C \cdot \alpha$
- $Y = C\alpha \cdot \alpha + C\gamma \cdot \gamma$
- $Y = (C\alpha_0 + \delta\alpha \cdot \Delta Fz) \cdot \alpha + (C\gamma_0 + \delta\gamma \cdot \Delta Fz) \cdot \gamma$

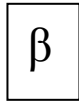
VEHICLE ATTITUDE



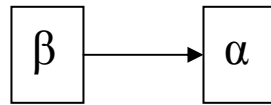
LOGIC



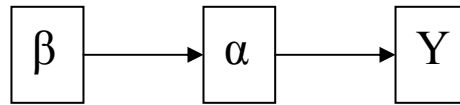
Complete Logic



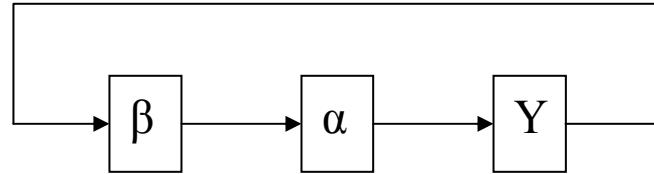
Complete Logic



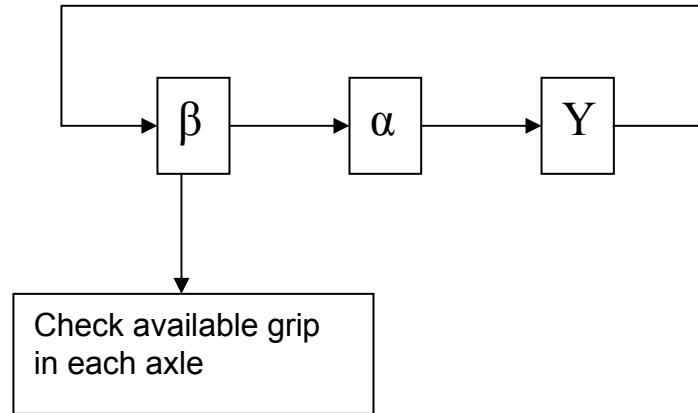
Complete Logic



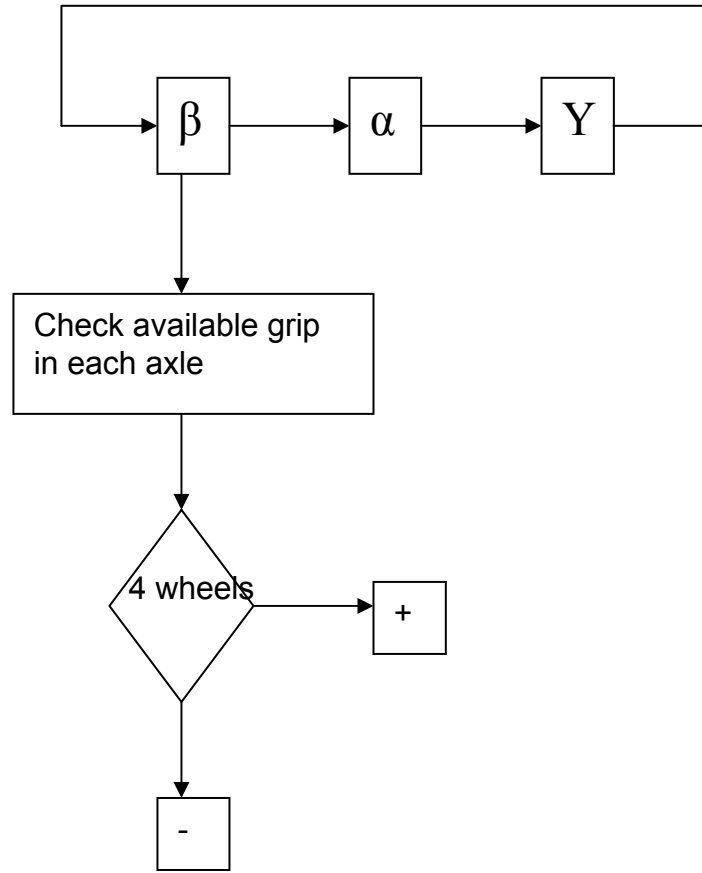
Complete Logic



Complete Logic



Complete Logic



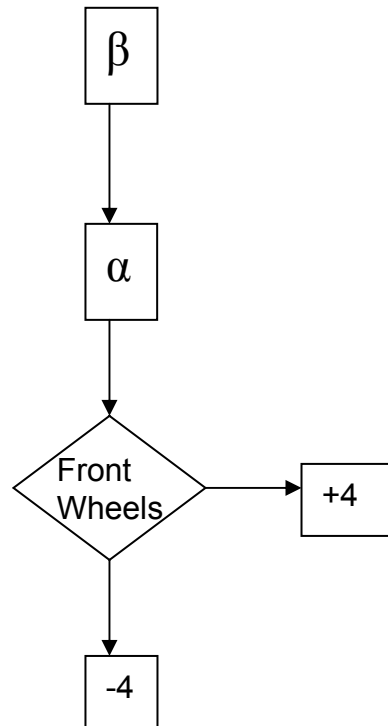
Simplified Logic

β

Simplified Logic



Simplified Logic



LOGIC COMPARISON

• COMPLETE LOGIC

- $\Delta N / \Delta \beta = 0$ (neutral)
- $\Delta N / \Delta \beta > 0$ (o/s)
- $\Delta N / \Delta \beta < 0$ (u/s)

- $N = Y_f \cdot a - Y_r \cdot B$

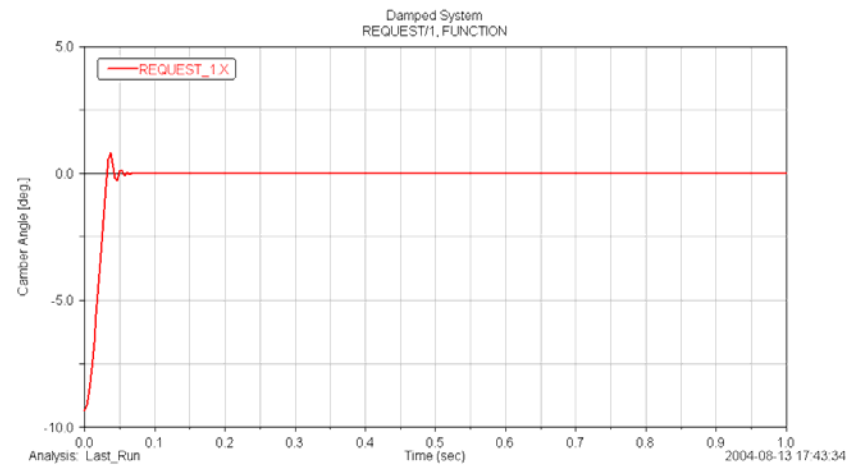
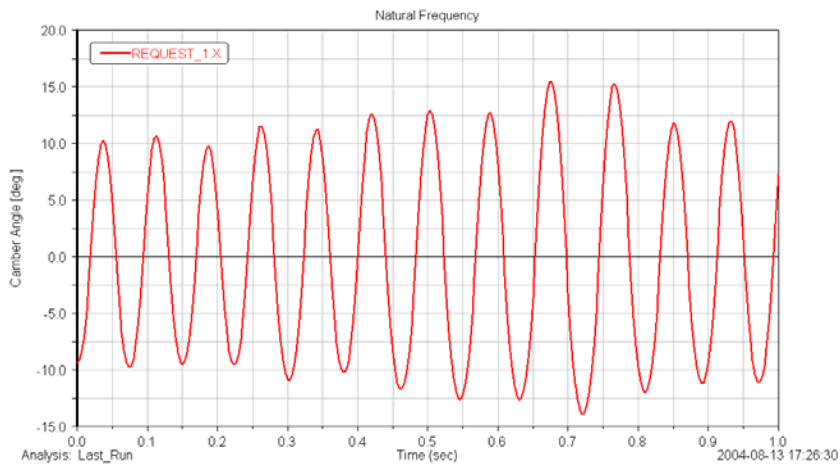
- $\beta = \int ((A_y/V) - r) dt$

• SIMPLIFIED LOGIC

- $\alpha_f = \alpha_r$ (neutral)
- $\alpha_f > \alpha_r$ (u/s)
- $\alpha_f < \alpha_r$ (o/s)

- $\beta \approx v / u$
- $\alpha_f \approx \beta + ((a \cdot r) / u) - \delta$
- $\alpha_r \approx \beta - ((b \cdot r) / u)$

CRITICAL DAMPING



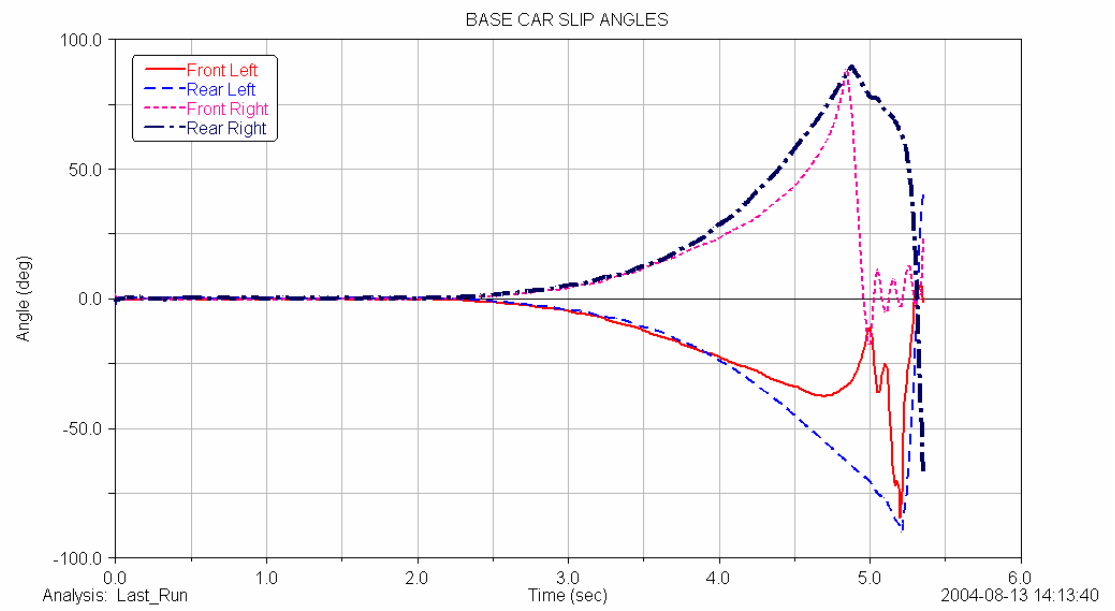
MODEL VALIDATION

- BASE CAR

Last_Run Time= 0.0100 Frame=2




- BASE CAR



MODEL VALIDATION

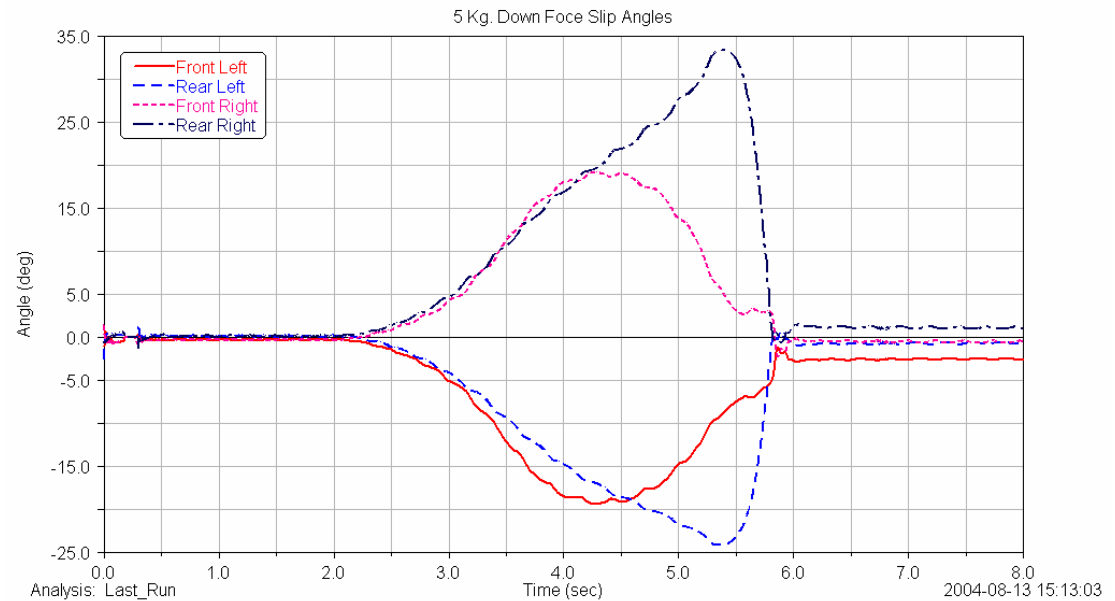
- BASE + 5kg

Las_Run Time= 0.0100 Frame=2



MODEL VALIDATION


- BASE +5kg



MODEL VALIDATION

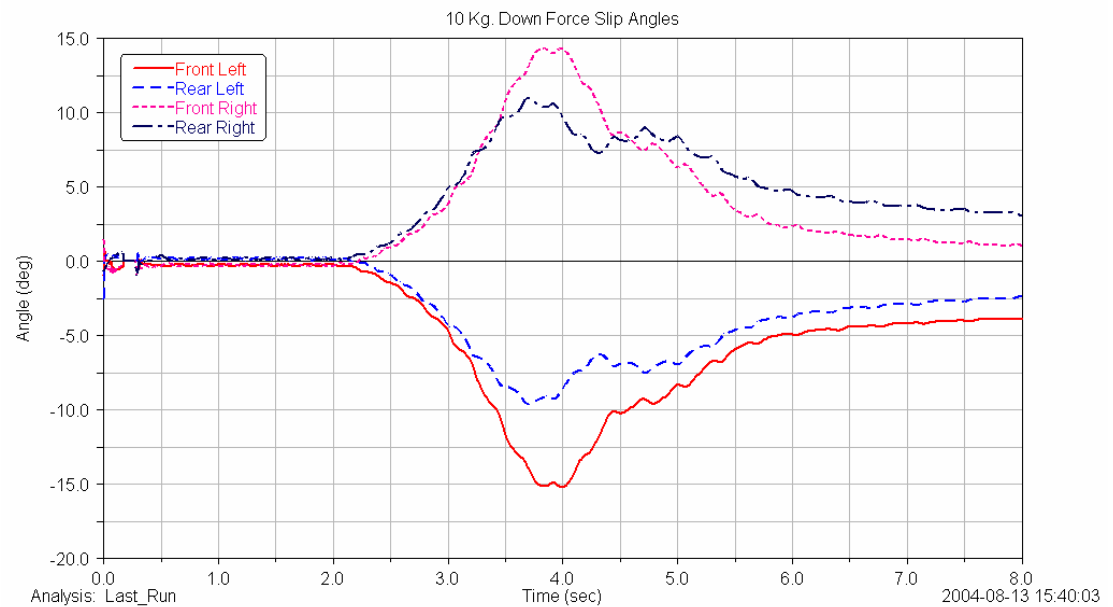
- BASE +10kg

Last_Run Time= 0.0100 Frame=2



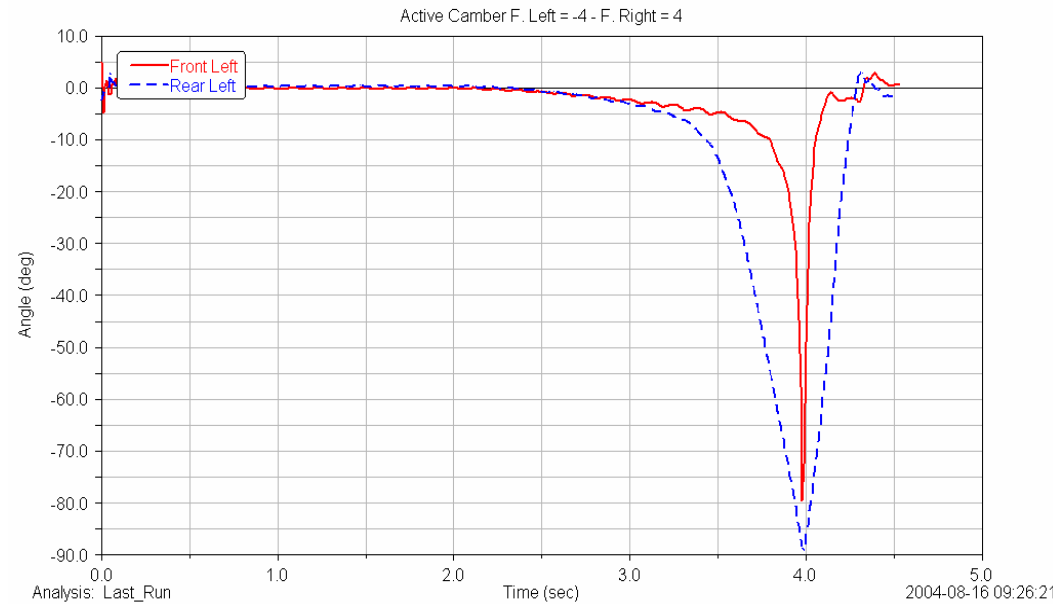
MODEL VALIDATION

- BASE +10kg



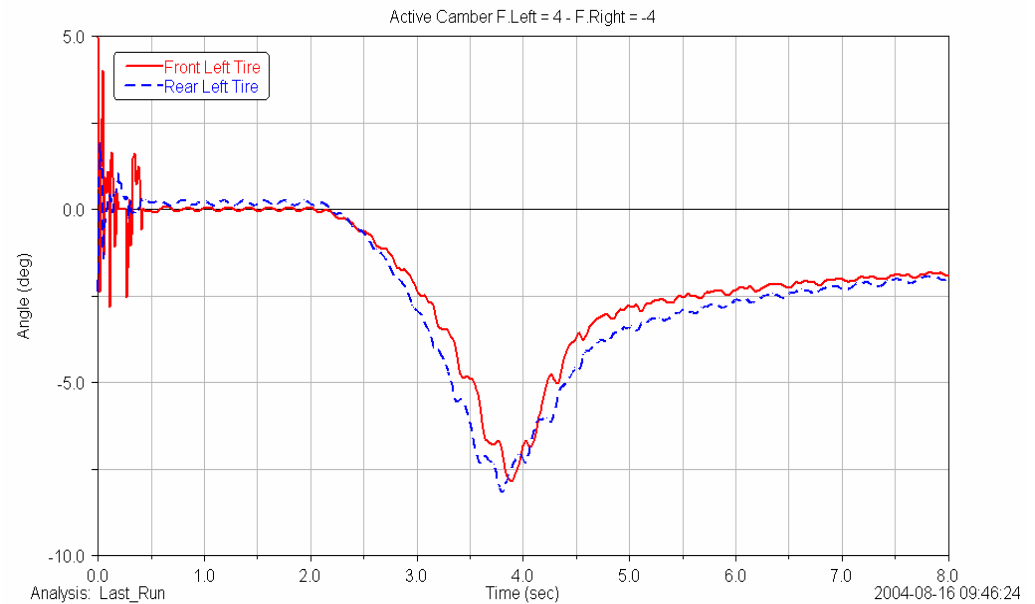
COMPLETE O/S CAR

- +4 deg. Front Right
- -4 deg. Front Left



COMPLETE U/S CAR

- +4 deg. Front Left
- -4 deg. Front Right

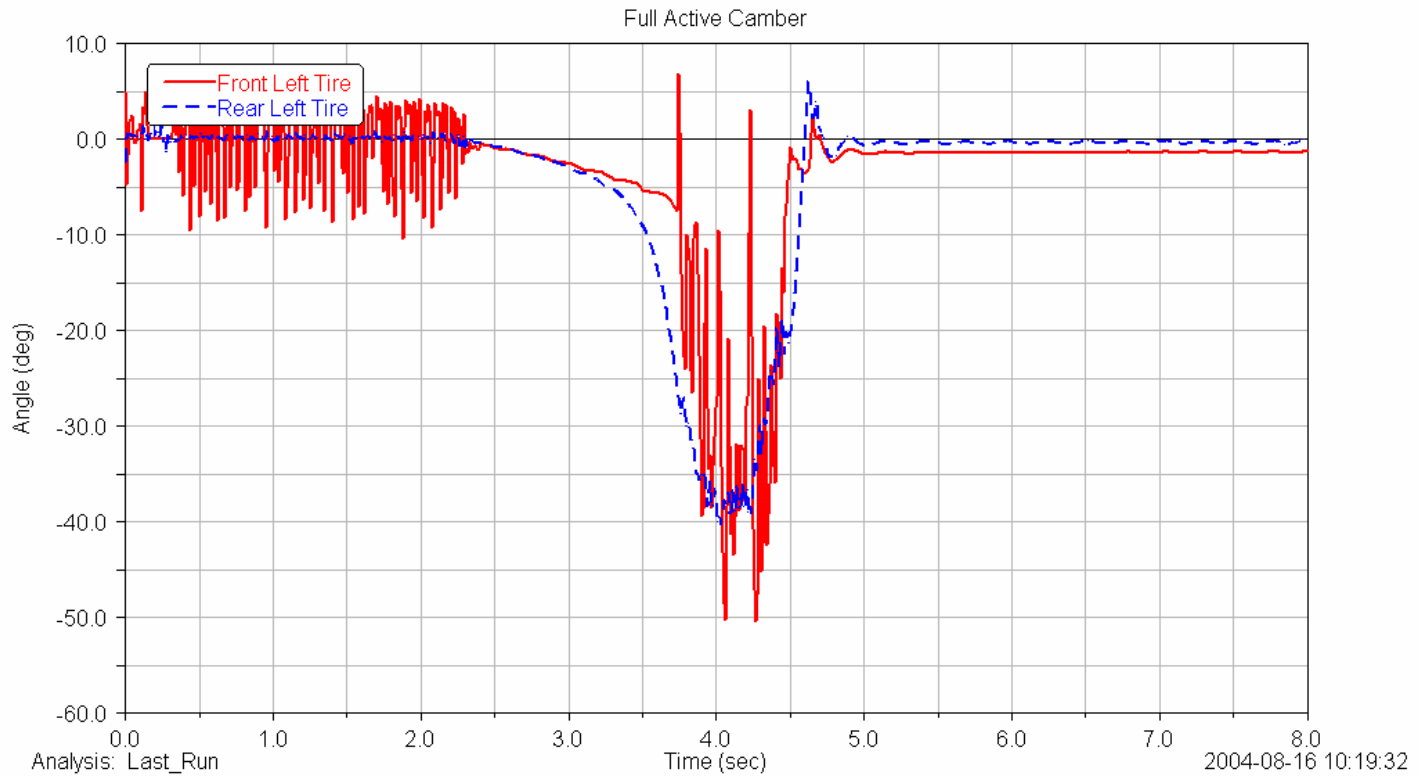


ACTIVE CAMBER CAR

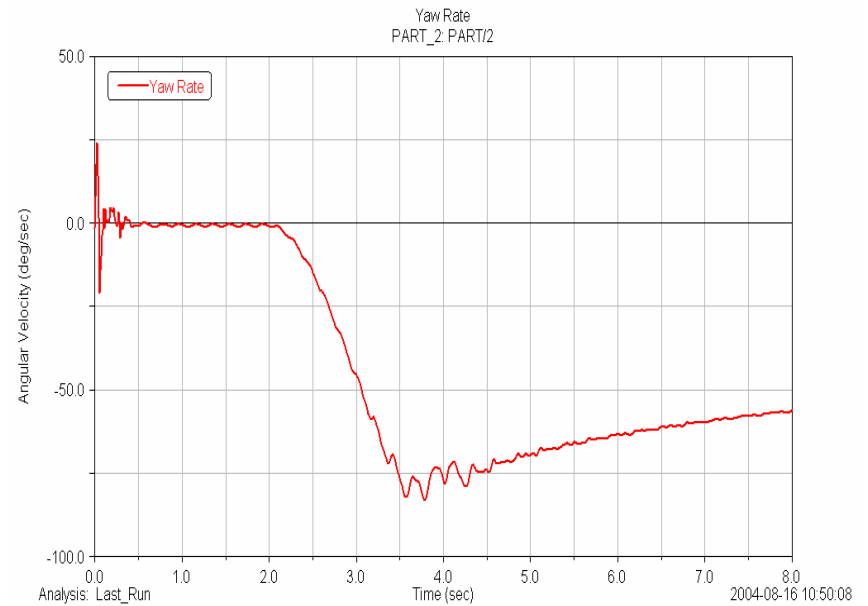
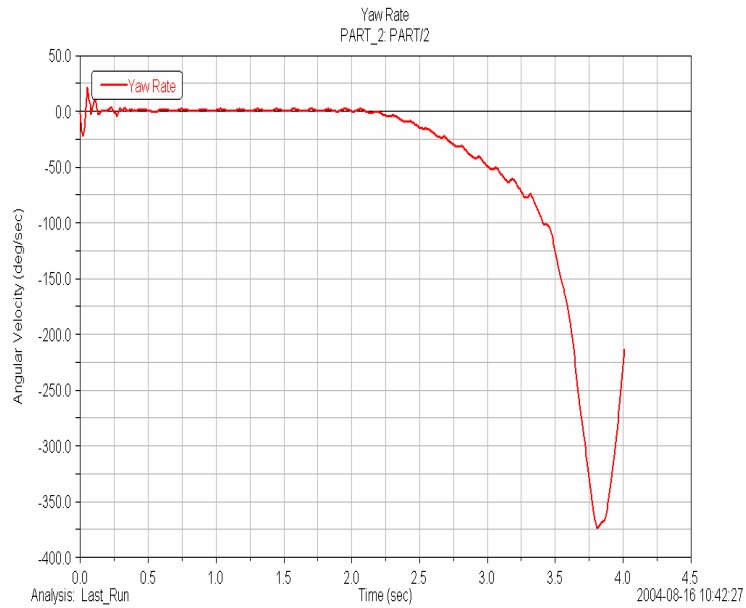
Last_Run Time= 0.0100 Frame=2



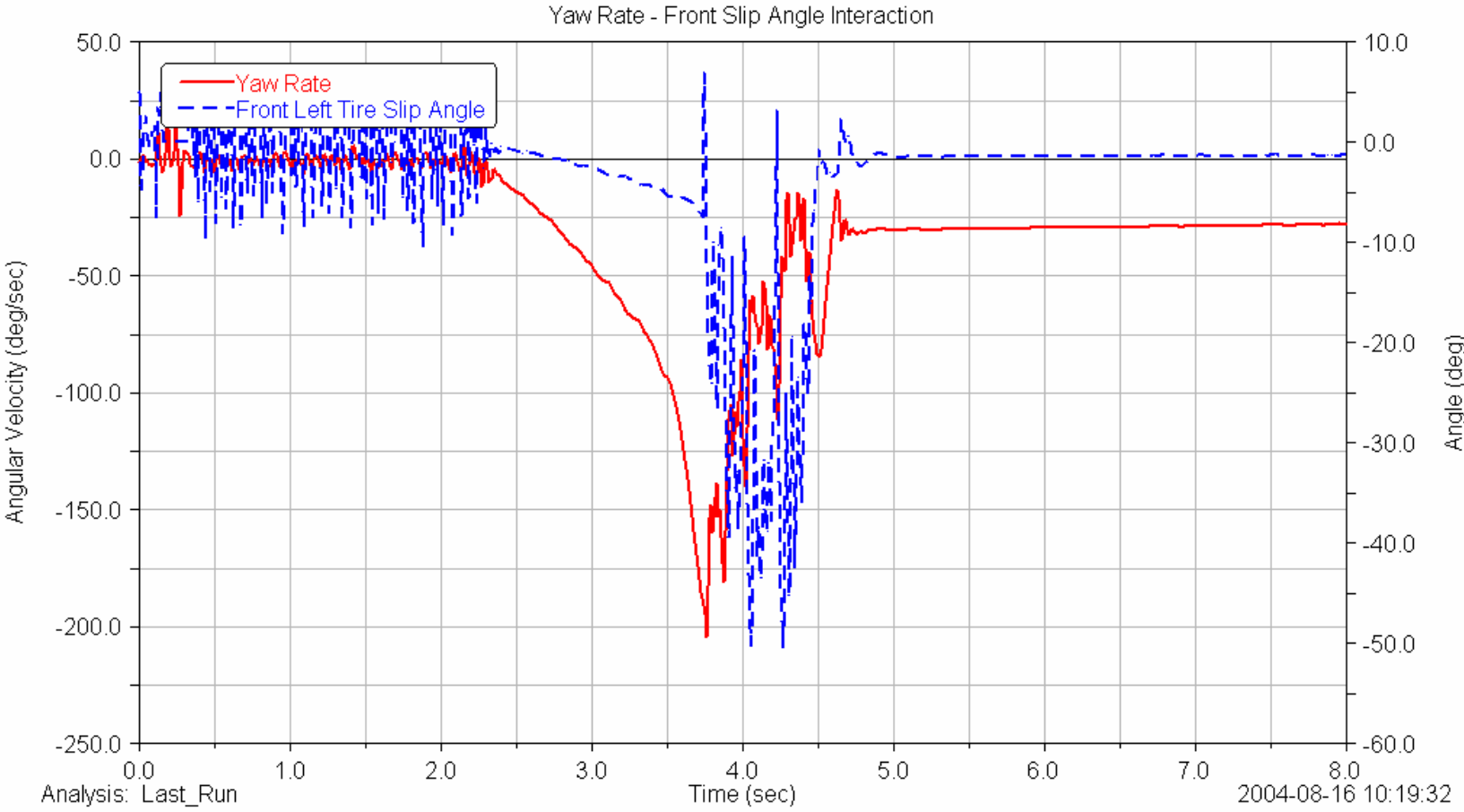
ACTIVE CAMBER CAR



ACTIVE CAMBER CAR



ACTIVE CAMBER CAR



FUTURE WORK

- Modelling of complete logic (PID)
- Introduction of different manoeuvres (lane change)
- Try other logics, such make the camber dependent on tire vertical loads instead of vehicle attitude
- Construction of a prototype