Front and Rear Aerodynamic load Calculation

Mass transfers in braking and acceleration must be taken in account to calculate aerodynamic loads.
The following math channels must be created :

Front Aero Load :
FzF = (FL Pushrod + FR Pushrod) + M x 9,81 x (H/E) x G

Rear Aero Load :
FzR = (RL Pushrod + RR Pushrod) - M x 9,81 x (H/E) x G

With : M : car mass
H : height of the centre of gravity
E : wheelbase length
G : Longitudinal acceleration in g , positive on acceleration.

The G is given by an accelerometer fitted in the longitudinal direction or by the differentiation of the car speed

S.CZ calculation

For a whole lap, plot the XY graph of the total aero load (FzFront + FzRear) versus the Pitot Pressure. The slope of the line is the S.Cz.

Front and Rear S.Cz may be found separately by plotting FzFront or FzRear.

Attention, the S.Cz depends, not only on wings and flat bottom, but also on the car ride height and pitch.
Generaly, the rear load increases when the rear ride height lowers and the front load rises with the pitch .
It may be interesting to calculate the S.Cz on just a portion of the graph.

Pushrod offset Correction

The graphs of Front and Rear S.Cz must pass through zero, if not, modify the offsets for the pushrods.

Aerodynamic balance

Calculate the ratio (FzFront / FzTotal). Il is important to analyse the aerodynamic balance behaviour versus speed, in function of ride height and pitch changes, to understand understeer or oversteer.