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# 二輪車の定常円旋回特性に関する研究

Study on Characteristics of Steady State Turning for  
Two-wheeled Vehicles

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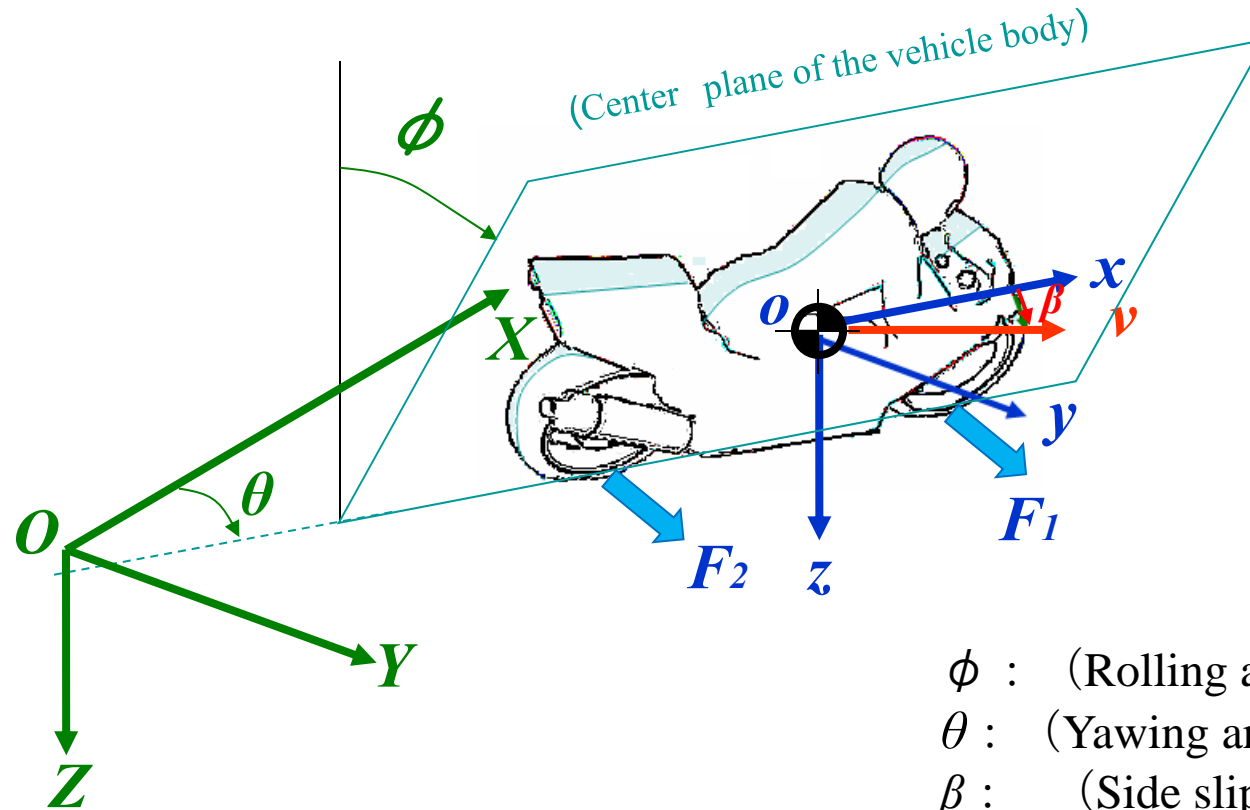
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## Specification of the experimental vehicle

Parameter	definition	value
$m$	Vehicle mass	260 (kg)
$l_1$	Length between front tire axle and C.G.	0.913 (m)
$l_2$	Length between rear tire axle and C.G.	0.636 (m)
$h_G$	Height of C.G.	0.599 (m)
$C_{s1}$	Front cornering coefficient	11.3 (-)
$C_{s2}$	Rear cornering coefficient	16 (-)
$C_{c1}$	Front camber coefficient	1.2 (-)
$C_{c2}$	Rear camber coefficient	1.5 (-)

# Coordinate systems for two wheeled vehicle



$\phi$  : (Rolling angle)

$\theta$  : (Yawing angle)

$\beta$  : (Side slip angle of C.G.)

$v$  : (Vehicle speed)

$F_1$  (Lateral force of front tire)

$F_2$  : (Lateral force of rear tire)

# Influence of camber thrust in steer characteristics

A term of the camber thrust in the SF is as follows,

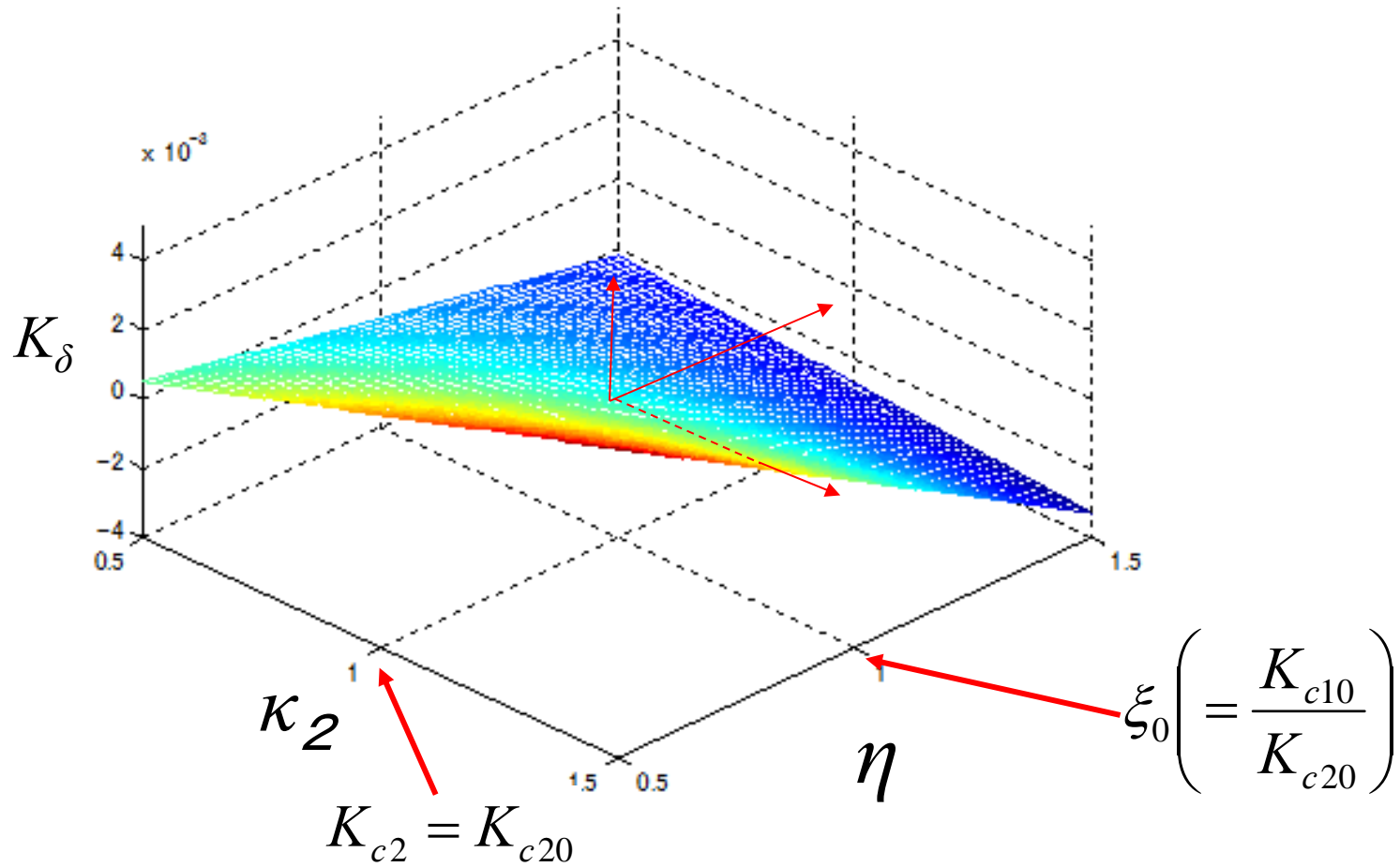
$$K_C = \frac{K_{c2}K_{s1} - K_{c1}K_{s2}}{gK_{s1}K_{s2}l} = \frac{l_1mg\kappa_2(K_{s1} - \xi K_{s2})}{gK_{s1}K_{s2}l^2} = \frac{l_1m\kappa_2(K_{s1} - \xi K_{s2})}{K_{s1}K_{s2}l^2}$$

In the same way, the side slip characteristics is as follows,

$$K_{\beta_C} = \frac{K_{c2}l}{gK_{s2}l_2l} = \frac{K_{c20} \frac{K_{c2}}{K_{c20}} l}{gK_{s2}l_2l} = \frac{l_1mg\kappa_2}{gK_{s2}l_2l}$$

# Influence of camber thrust to the stability factor

## Stability factor



# Conclusions

Analyzing the steady state characteristic of a two-wheeled vehicle, the results were obtained as follows,

1. Since the steer characteristic and sideslip characteristics of a two-wheeled vehicle are described by camber thrust and cornering force, in a linear region, it is separated into two parts, one is described by just cornering forces such as passenger cars, and the other is connected by camber thrust which is original term on two-wheeled vehicles.