



weaRIDE:

tyre wear physics for realtime
simulation and advanced
analyses



CONTENTS

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Introduction

Model summary with a focus on the main characterizing factors

02

Tyre wear mechanism

Two main mechanisms of wear, abrasion and degradation, underlining their peculiar aspects

03

Physical modelling

Main physical aspects and modelling hypotheses

04

Applications

Different scenarios and applications within the RIDEsuite simulation platform



INTRODUCTION



MR RIDEsuite modules

RIDEsuite

01



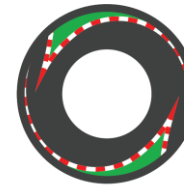
adherIDE
MF-EVO module
an
infrastructure
consisting of an
evolved MF
model

02



thermoRIDE
Thermal module
a real-time
thermodynamic
model

03



threedeeRIDE
Multicontact
module
a multi-contact
ride model

04



weaRIDE
Wear module
a model for the
prediction and
analysis of wear



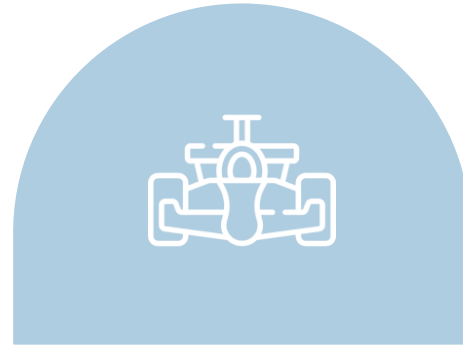


WHY MODELLING TYRE WEAR?



PRODUCT DEVELOPMENT

Help tyre makers to improve the prototyping and pre-development phase of new tyres before the production process



TYRE DYNAMICS SIMULATION

Improve simulations of thermal and dynamic phenomena involving the tyre by taking into account runtime thickness variations



ENVIRONMENT

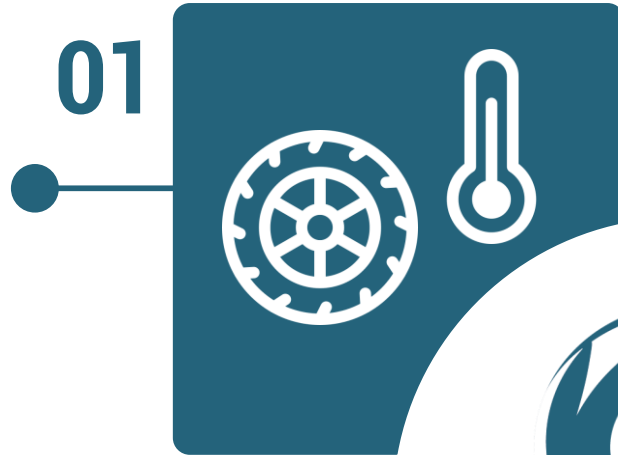
Contribute to the improvement of tyre sustainability through the study of the wear particle emission as a function of operating conditions



PHYSICAL MODELLING

01 Tyre characterization, viscoelasticity and temperature

- Storage modulus and loss factor
- Compound temperature along the lateral and radial direction



02

Kinematic and Dynamic Signals

- Sliding velocity for each rib
- Tyre forces for each rib



03

Road Roughness

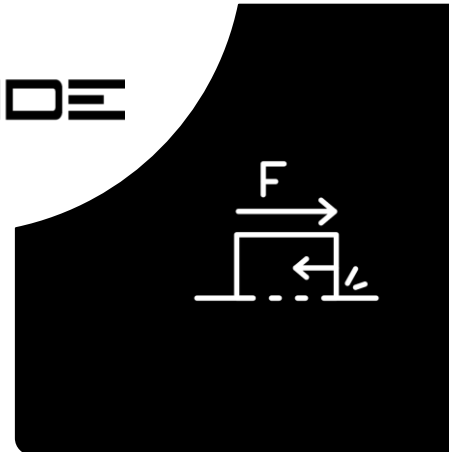
- Parallel correlation length
- Perpendicular correlation length



04

Equilibrium

- Balance between applied external forces and induced stress state
- Damage formulation





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