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Scuola Politecnica e delle Scienze di Base

Corso di Studi in Ingegneria Meccanica

((Classe delle Lauree in Ingegneria Industriale) (Classe N. LM-33)

Elaborato di Laurea

# Fractal combustion model: application to a turbocharged SI engine

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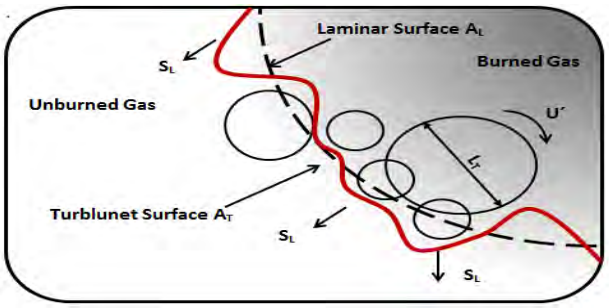
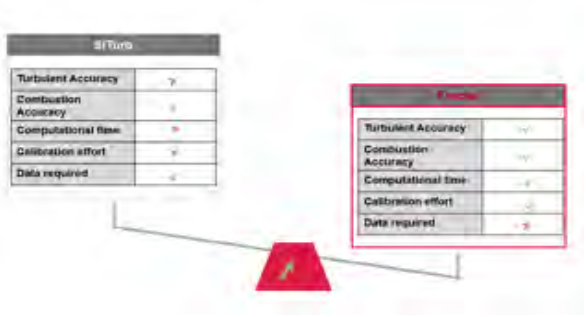
**SOMMARIO**

In this master thesis a three cylinder high performance gasoline engine is numerically investigated by means of three different combustion models. In the first part a brief introduction of the base model, with non-predictive combustion, and an accurate description of the other two models, with a predictive approach.

The first predictive models is embedded in GT-Power Gamma Technology, while the second, the fractal, is developed by University of Naples Federico II. For both of them an explanation of the physical based theory is done, followed by the necessary calibration work and the results comparison with the test bench measurements.

Finally a comparison of the two predictive models in terms of accuracy, calibration effort and computational time is made. Both models give satisfying results compared with test bench data in terms of performance and combustion. However SITurb is unable to produce realistic results of the turbulent field during the entire engine cycle. Nevertheless the biggest difference is the lower calibration effort of the fractal model due to a step-by-step calibration guide and a division of the turbulence and combustion calibration.

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