GEARSHIFT TOOL

Release 1.0.1

see AUTHORS.rst

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JRC Python Gearshift Calculation Tool

versions

documentation https://gearshift-calculation-tool.readthedocs.io/en/latest/

sources https://github.com/JRCSTU/gearshift_calculation_tool

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short name JR-Shift

live-demo

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A python-3.6+ package to generate the *gear-shifts* of Light-duty vehicles

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CHAPTER

ONE

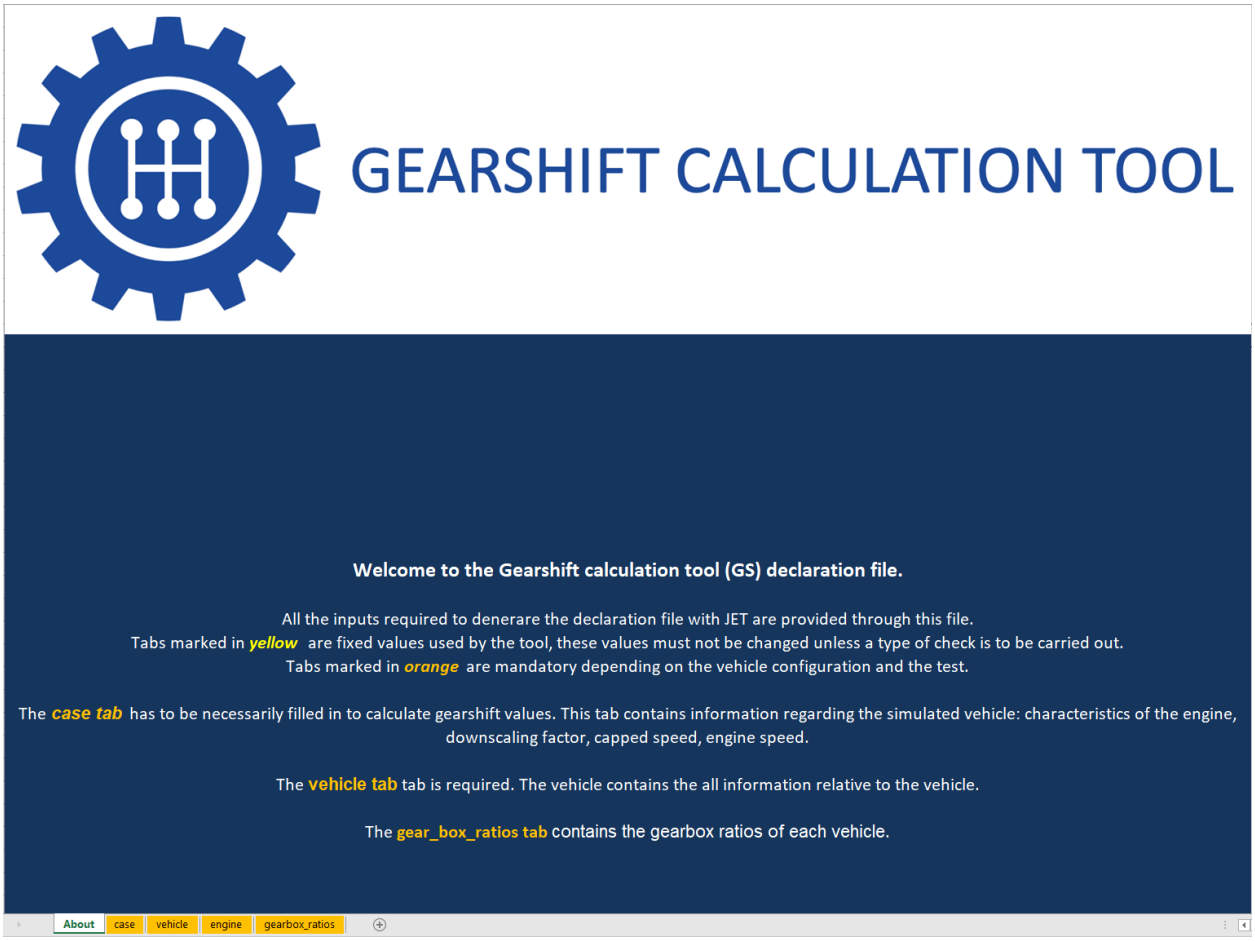
INTRODUCTION

The aim of the JR-Shift is obtain the Required Engine Speeds, the Available Powers, the Required Vehicle Speeds and the Gears for the whole WLTC based on the vehicle characteristics. The model should allow accurate calculation of final trace and the operating conditions of the engine.

1.1 Overview

The calculator accepts as input an excel file that contains the vehicle's technical data, along with parameters for modifying the execution WLTC cycle, and it then spits-out the gear-shifts of the vehicle and the others parameters used during the obtaining of these. It does not calculate any CO_2 emissions.

1.2 Input File



The input file of the GEARSHIFT tool is an excel file, structured in different sheets.

- **Case sheet:** The case sheet contains a list of cases that the tool will run.
- **Vehicle sheet:** The vehicle sheet contains a list of vehicles along with their characteristics.
- **Engine sheet:** The engine sheet contains the vehicle's full load curves.
- **Gearbox Ratios sheet:** The gearbox ratios sheet contains the gearbox transmission ratios.

CHAPTER

TWO

QUICK-START

2.1 Cmd-line usage

The command-line usage below requires the Python environment to be installed, and provides for executing an experiment directly from the OS's shell (i.e. `cmd` in windows or `bash` in POSIX), and in a *single* command. To have precise control over the inputs and outputs

```
$ gearshift --help                                                    ## to get generic␣
↪help for cmd-line syntax
$ gearshift demo                                                      ## to get demo␣
↪input file
$ gearshift run "path_input_file" -O "path_to_save_output_file"       ## to run␣
↪gearshift tool
```

CHAPTER

THREE

INSTALLATION

3.1 Prerequisites

Python-3.6+ is required and **Python-3.7** recommended. It requires **numpy/scipy** and **pandas** libraries with native backends.

Tip: On *Windows*, it is preferable to use the Anaconda distribution. To avoid possible incompatibilities with other projects

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3.2 Download

Download the sources,

- either with *git*, by giving this command to the terminal:

```
git clone https://github.com/JRCSTU/gearshift_calculation_tool --depth=1
```

3.3 Install

From within the project directory, run one of these commands to install it:

- for standard python, installing with `pip` is enough (but might):

```
pip install -e .[path_to_gearshift_calculation_tool_folder]
```

CHAPTER

FOUR

GEARSHIFT MODEL

GEARSHIFT model is plotted here below: you can explore the diagram nests by clicking on them.

The execution of gearshift model for a single vehicle is a procedure in three sequential stages:

- **Calculate Speed Trace**: Scales down specified sections of a given trace by the given downscale factor (see next section *Model structure*).
- **Calculate shift points, Ndv and full power curve**: Determines shift-points over trace-time (see next section *Model structure*).

4.1 Model structure

The model is structured in two dispachers:

- scaleTrace: This dispacher is responsible to apply the all requirements defined in the Sub-Annex 1 in the Commission Regulation (EU) 2017/1151 of 1 June 2017.
- calculateShiftpointsNdvFullPC: This dispacher is responsible to apply the all requirements defined in the Sub-Annex 2 in the Commission Regulation (EU) 2017/1151 of 1 June 2017.

4.1.1 Project files and folders

The files and folders of the project are listed below:

```
+--gearshift/                                    # main folder that contains the␣
↪whole gearshift project
|   +--cli/                                      # folder that contains all cli␣
↪scripts
|   +--core/                                     # folder that contains core␣
↪packages
|       +--load/                                 # (package) python-code of the␣
↪load
|           +--speed_phases/                     # folder that contains speed␣
↪phases in ftr format
|           +--excel.py                          # (script) load from the excel␣
↪file parameters
|       +--model/                                # (package) python-code of the␣
↪model
|           +--calculateShiftpointsNdvFullPC/    # (package) python-code of the␣
↪calculate shift points, Ndv and  FullPC
|           +--scaleTrace/                       # (package) python-code of the␣
↪calculate scale trace
```

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```
|       +--write/                                    # (package) python-code of the␣
↪write
|           +--excel.py                              # (script) write to the excel␣
↪file output parameters
|   +--demos/                                        # folder that contains demo files
|   +--docs/                                         # folder that contains␣
↪documentation
+-- AUTHORS.rst
+--setup.py                                          # (script) The entry point for␣
↪`setuptools`, installing, testing, etc
+--README.rst
+--LICENSE.txt
```

CHAPTER

FIVE

API REFERENCE

The core of the library is composed from the following modules:

Defines the file processing chain model *dsp*.

Sub-Modules:

`core`	Functions and *dsp* model to processes a JR-Shift input file.
`cli`	Define gearshift command line interface.

CHAPTER

SIX

INDICES AND TABLES

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