Generic File Interface with Continuous Casting Simulatior

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1 INTRODUCTION

This document describes the file-based interface with the Robert Vertnik's continuous casting simulator, which makes possible to perform numerical simulations of the casting process in programmable serial or parallel sequences, where the specified set of input parameters are set before each run and where the simulator output is collected and stored after each simulation. The interface is provided in a library form based on the *IGLib*, and is aimed for linkage with various process environments such as artificial neural network – based modeling software or optimization software. This document contains crucial information necessary to use the simulator through the input/output interface. For detailed information on the interface itself, see the code documentation where the complete interface functionality is documented in detail.

2 DESCRIPTION OF THE CASTING SIMULATOR OPTIMIZATION INTERFACE

2.1 Directory Structure

All data is always in a directory named "*Sim_main*". Thid directory has several subdirectories for different things (e.g. for executable, for input data, for output, etc.):

- Sim_main/EXE – executable, basic information such as directory location, etc.
- Sim_main/ IN_PUT – input data
- Sim_main/OUTPUT – output data

Each of these directories contain subdirectories for different projects. Names of these subdirectories must be the same for a specific project in all subdirectories. For example,

Sim_main/EXE/<project_name>

contains executable for the project named <project_name>. By this logic,

Sim_main/ IN_PUT/SS

contains input data for project SS, and

Sim_main/OUTPUT/SS

contains output data for the same project.

2.1.1 Important files

The file

Sim_main/EXE/<project_name>/Drive.Txt

must contain absolute path of the directory that contains the Sim_main directory that is currently in use for simulation. Be careful – always check that this file contains the correct location of the directory, otherwise the simulator will exit with error!

The file

Sim_main/EXE/<project_name>/Sim_main.exe

contains the executable.

The file

Sim_main/IN_PUT/<project_name>/sim_name.inp

contains name of the input and output file names (without extensions) used by the simulator for the project named <project_name>. **Name must be 8 characters long**! Here there are also some flags whose values must be either ”YES” or ”NO_”, e.g. for showing graphics or for writing optimization input or output file in JSON.

The file

Sim_main/IN_PUT/<project_name>/<sim_name>.json

contains optimization input parameters that must be written as a vector in IGLib’s JSON format.

The file

Sim_main/OUTPUT/<project_name>/<sim_name>.json

contains the calculated output values (used for optimization) written as a vector in IGLib’s JSON format.

2.1.1.1 Material properties

Files with material properties are in the directory

Sim_main/ MAT_PROP with extension *.dat*. Which material data is taken is specified in the file

Sim_main/IN_PUT/<project_name>/<sim_name>.sim

Below the string “MATERIAL PROPERTIES BLOCK”. Name of the file without extension is stated there.

For example, the file **ss_8159_.dat** contains properties for the steel **51 CrV4**

2.2 Future Versions

There are still some questions to be addressed in the future versions of the interface, in particular:

- Can the simulator be naturally launched as a blocking call?
- Can the simulator be called without launching the graphic environment?

- Can different knds of output be suppressed selectively?

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