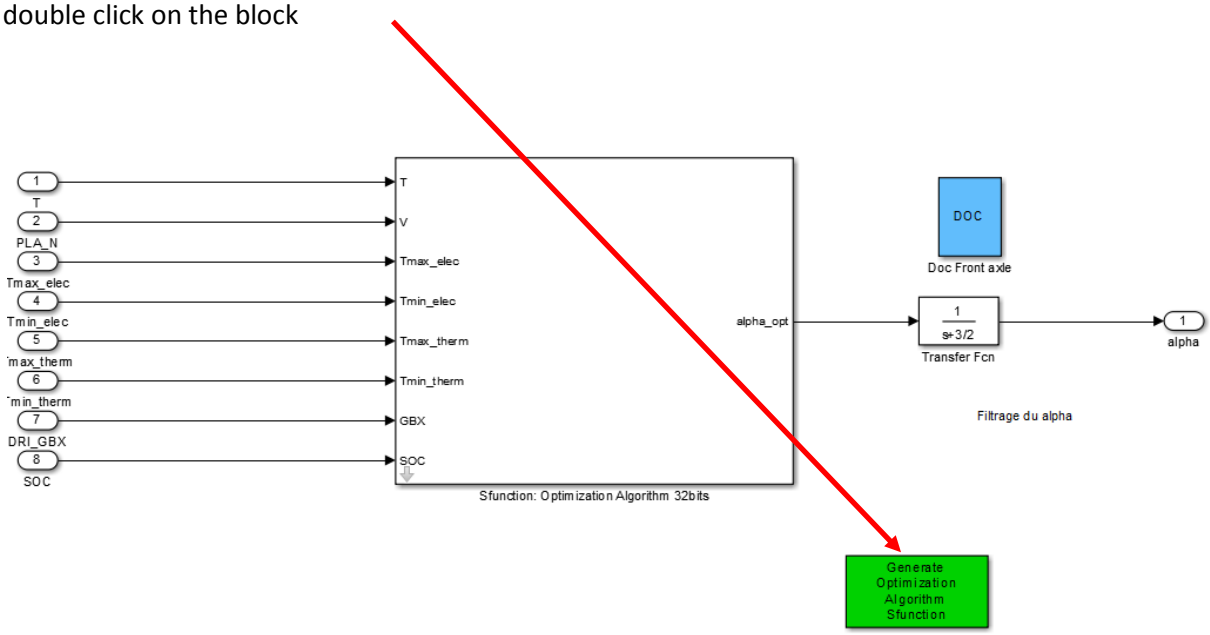
Command Torque Repartition Algorithm

1 System description

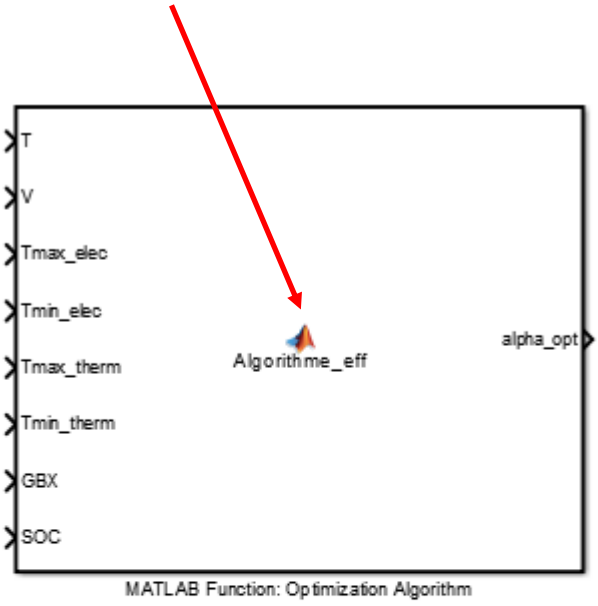
The algorithm is implanted on the Simulink model as a matlab function. It calls different files .mat (fa_differential_ratio.mat, fa_gearbox_ratio .mat, ra_differential_ratio.mat, SP_elec.mat, SP_therm.mat, Tab_poly_elec.mat, Tab_poly_therm.mat) which contains datas which must be loaded in the workspace of the function (the matlab workspace and the function are different and each function has her own workspace).

With the matlab function, the model runs in ~55 minutes because it compile in C code at each sample time. To decrease the calculation time (less than 3 minutes), a sfunction of the algorithm is created (a sfunction contains c code and runs faster than a matlab function because it is not compiled at each saple time). The sfunction is created for a 32 bits or 64 bits version depending on the computer used. To generate the sfunction in your corresponding version you may follow the following steps :

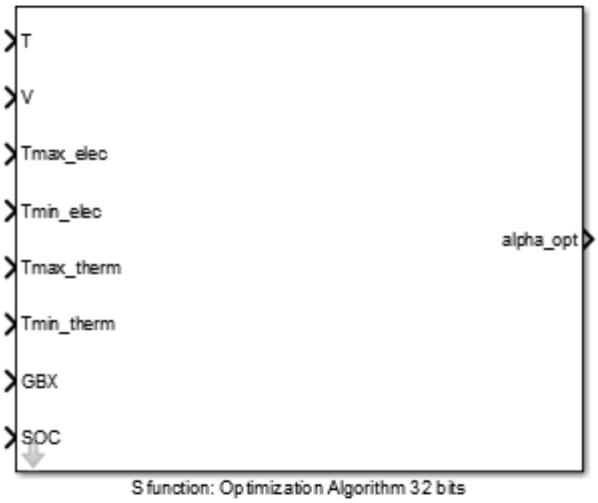
- double click on the block



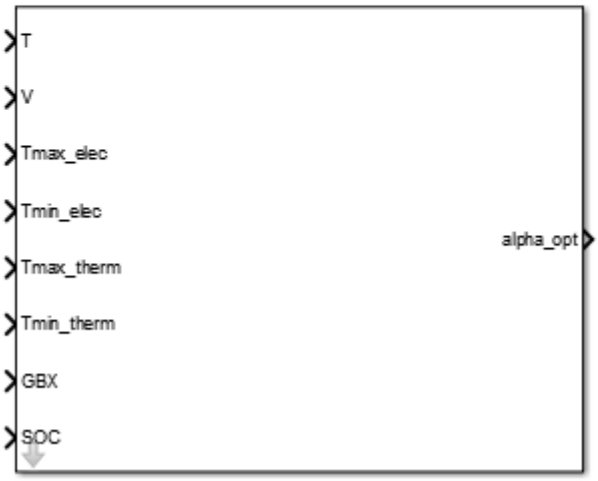
- right click on the matlab function



MATLAB Function: Optimization Algorithm



S function: Optimization Algorithm 32 bits



Sfunction : Optimization algorithm 64bits

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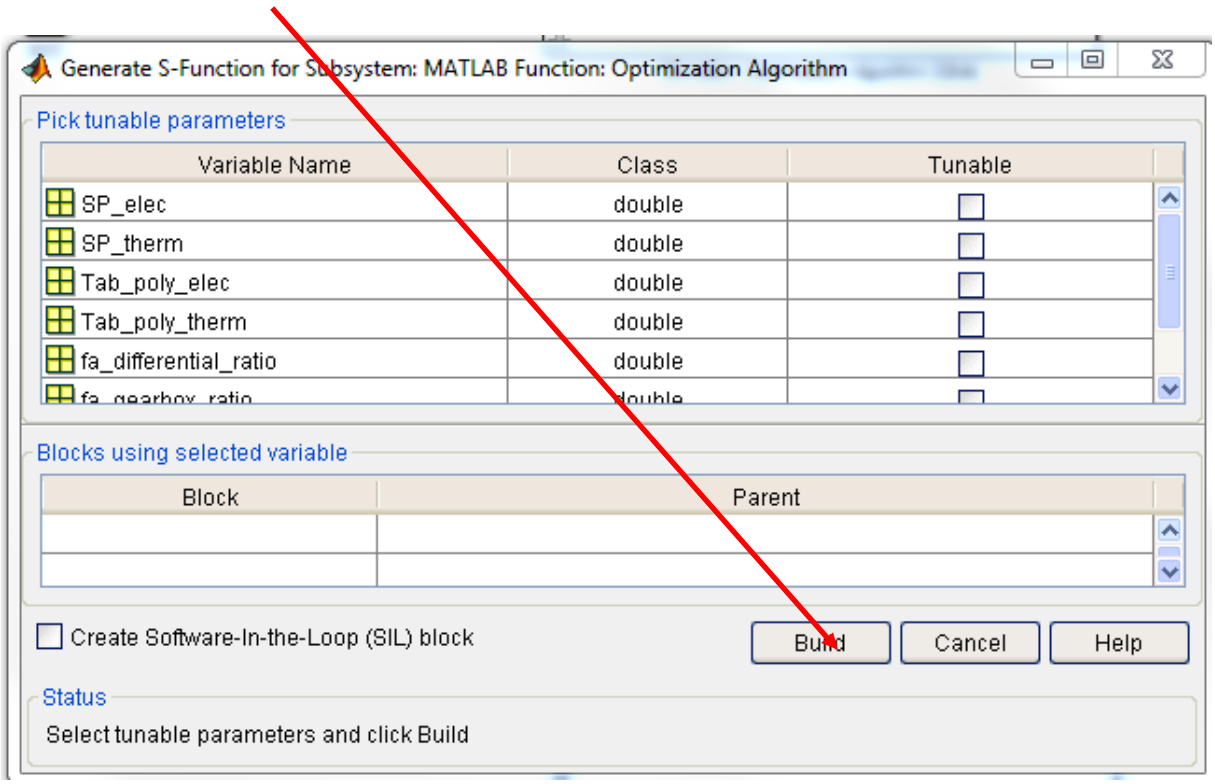
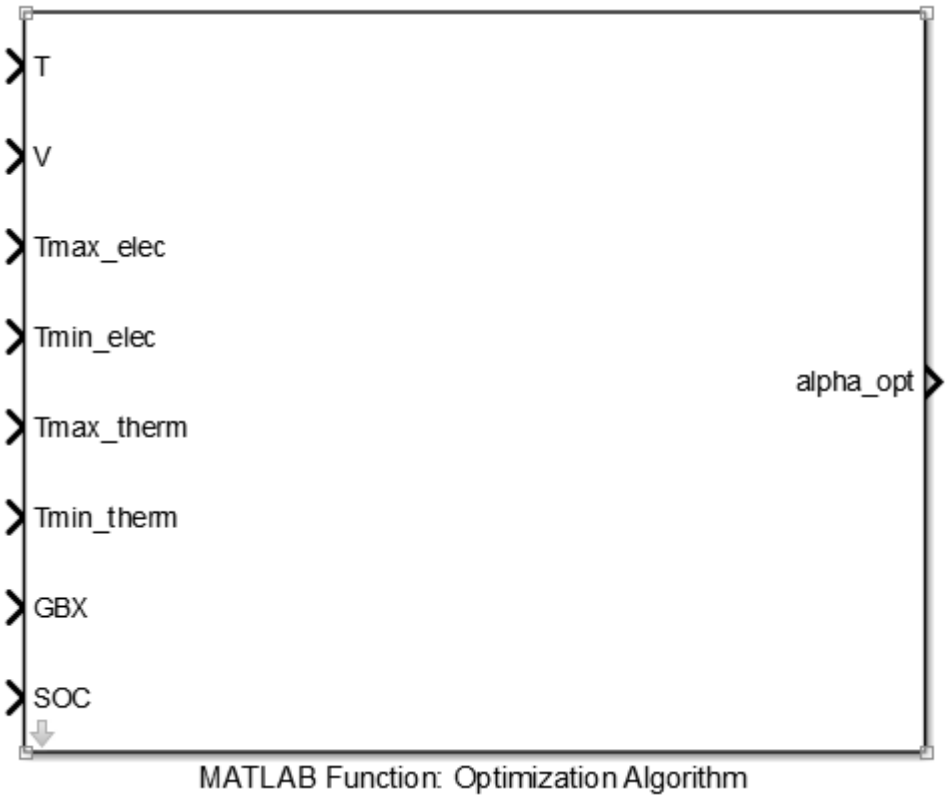
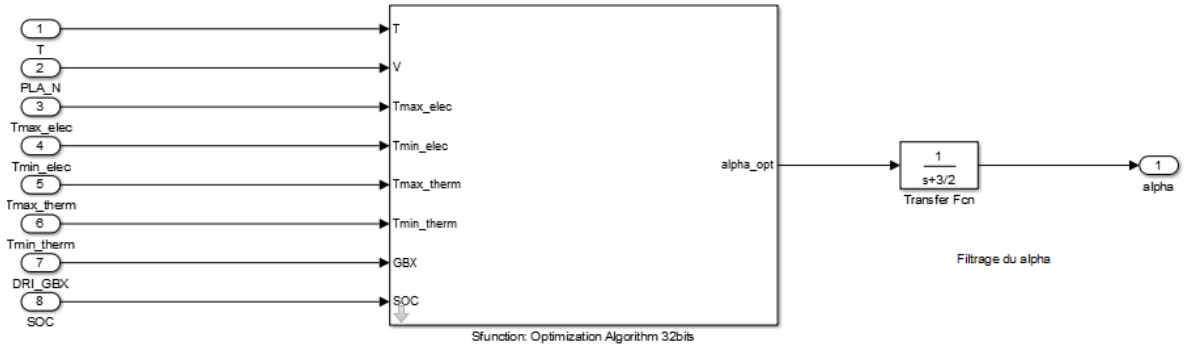
- C/C++ code
- click on Generate S-Function
- click on build


Generate S-Function for Subsystem: MATLAB Function: Optimization Algorithm
Pick tunable parameters
Variable Name
Class
Tunable
SP_elec
double
SP_therm
double
Tab_poly_elec
double
Tab_poly_therm
double
fa_differential_ratio
double
Blocks using selected variable
Block
Parent
Create Software-In-the-Loop (SIL) block
Build
Cancel
Help
Status
Select tunable parameters and click Build

- Copy the block created



- Paste it in HEV model/Command/Torque repatition/Optimization Algorithm



- The sfunction in the model 5.0 (in Optimization_Algorithm.mdl)were generated with matlab 2013a (32 bits version) and matlab 2014b (64 bits version)