

DESCRIPTION

This is the graphical user interface called *FOTF Time-domain Identification Tool*. It serves as the front-end for the `fid()` function. It is shown in Figure 6.8.

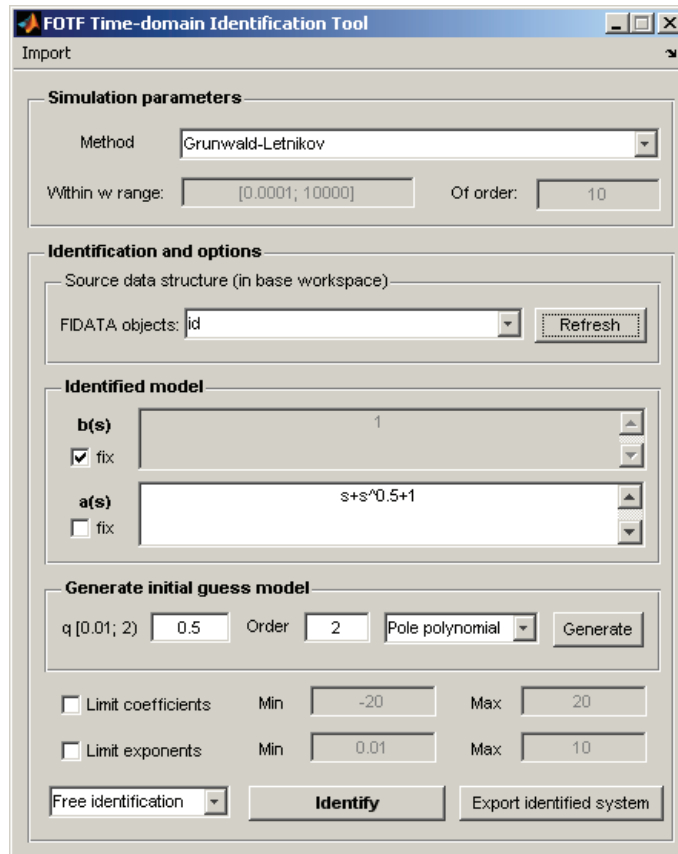


Figure 6.8: FOTF Time-domain Identification Tool user interface

The *Simulation parameters* panel allows selecting the preferred system simulation type. This includes the following:

- Grünwald-Letnikov evaluation of fractional derivatives.
- Oustaloup filter approximation.
- Refined Oustaloup filter approximation.

The last two options require setting the necessary approximation parameters.

The *Identification and options* panel has several control elements. First of all, a `fidata` structure needs to be selected from the list. The list is populated by base workspace objects of this type.

The *Identified model* panel contains textboxes with the fractional zero and pole polynomials in symbolic form. It also has checkboxes that allow to fix either polynomial during identification.

The *Generate initial guess model* panel allows to create an initial model. To do this, polynomials can be generated independently by specifying a commensurate-order q such that $0.01 \leq q < 2$, the order of the polynomial and hitting the *Generate* button.

Finally, the options panel provides means to limit the search range for coefficients and exponents. The identification type provides three options:

- free identification, i.e. all model parameters are optimized,
- fix exponents, good for obtaining fractional-order models by specifying a single commensurate order,
- fix coefficients, so only exponents are optimized.

Pressing the *Identify* button will invoke the `fid()` function and identification information will be shown in the MATLAB console. After the identification process completes, a plot with fitting results will be displayed. If the results are satisfactory, the system can be exported to workspace via the *Export to workspace* button.



Selecting $q = 1$ and fixing the exponents results in a classical, integer-order model identification problem. In such a case it is important to select either “Oustaloup filter” or “Refined Oustaloup filter” for simulation. Since fractional orders are not present in this case, approximation parameters are not important.

It is also possible to import an initial guess model via menu by selecting *Import*→*Initial guess model...* and typing the workspace name of the system.

6.2.3.2 Function `fotfrid()`

SYNTAX

```
fotfrid
```