

User manual for MF-DFA code written by Sadegh Movahed

1: You should write the name of your data file in it

2: To shuffled data set you should select YES here.

3: If you want to surrogate your data, select YES for this option

4: This value shows the number of shuffling data set.

5: Here you should determine the maximum and minimum no. of windows, i.e. if you select "10" for maximum and "2" for minimum, your data set is divided to 2 up to 10 non-overlapping windows.

6: If you want to calculate just $H=h(q=2)$ you should determine $q=2$., namely, $q_{max}=q_{min}=2$. To find the generalized Hurst exponent i.e. $h(q)$ versus q (moment exponent), must q_{min} and q_{max} to be different. Just in this case you can find the singularity spectrum for data set.

7: Here the step of moment exponent is determined.

8: In some case, we have to use double profile for data. It is done by the proper option in my program.

The name of output files are as follows:

- 1) hurst.txt gives generalized Hurst exponent versus q
- 2) log_f_s.txt gives the $\ln(F(s))$ versus $\ln(s)$
- 3) f_s.txt gives the fluctuation function versus "s"
- 4) tau.txt gives classical multifractal scaling exponent
- 5) D.txt gives generalized multifractal dimension
- 6) singularity.txt gives singularity spectrum
- 7) PDF.txt gives probability density function

The screenshot shows a control window for the MF-DFA code. It contains the following fields and controls:

- Name of data file = input.txt
- Number of Shuffling = 5
- Shuffling = No (dropdown menu)
- Min_Window = 2
- Surrogate = No (dropdown menu)
- Max_Window = 100
- Double Profile = No (dropdown menu)
- q_max = 2.0
- q_step = 0.5
- q_min = 2.0
- Hurst = (empty text box)
- RUN button
- CANCEL button

Red arrows from the text blocks point to the following elements in the window:

- Arrow 1 points to the "Name of data file" field.
- Arrow 2 points to the "Shuffling" dropdown menu.
- Arrow 3 points to the "Surrogate" dropdown menu.
- Arrow 4 points to the "Number of Shuffling" field.
- Arrow 5 points to the "Min_Window" and "Max_Window" fields.
- Arrow 6 points to the "q_max" and "q_min" fields.
- Arrow 7 points to the "q_step" field.
- Arrow 8 points to the "Hurst" field.