UMOEAsII Guide

June 4, 2016

1 Running UMOEAsII

- Extract UMOEAsII.rar.

- Run **main_loop.m**.

- You can change the dimension (**Par.n**) in **Introd_Par.m** to 10 or 30 or 50 or 100.

2 Results

- The results (best, max, median, mean, std., average running time, average success rate and average fitness evaluations) will appear on the Matlab Command Window. An example of the results obtained by UMOEAsII for 10D and 30D is depicted in Figure 1.

- The same results will be saved in **results.txt**, which will be created in the same folder.

- The detailed results (formatted as requested by the organizers) as well as seeds will be located in the "**Results_Record**" folder. Note that if you do not want to save these values, simply set **Par.Printing=0** defined in **Introd_Par.m**.

3 Seeds

As recommended by the organizers, we have used random seeds based on time, such that

    stream = RandStream('mt19937ar','Seed',sum(100*clock)*run);
    RandStream.setGlobalStream(stream);

However, we added the **run number** in the abovementioned code to differentiate among runs which may start at the same time, due to **parfor** (6 cores/workers were used in our code). This of course gives fair independent initializations.

(a) 10D

best	max	median	mean	std.	avg. running time	avg. success rate	avg. fitness evaluations
0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	793.5736e-003	1.0000e+000	53.1504e+003
0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	752.6800e-003	1.0000e+000	52.1189e+003
0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	602.6962e-003	1.0000e+000	43.7946e+003
0.0000e+000	4.3354e+000	0.0000e+000	170.0160e-003	849.9098e-003	1.1747e+000	960.7843e-003	64.5877e+003
0.0000e+000	20.0000e+000	19.9891e+000	13.0965e+000	9.4236e+000	3.9570e+000	19.6078e-003	99.9980e+003
0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	3.3106e+000	1.0000e+000	75.4611e+003
0.0000e+000	7.3960e-003	0.0000e+000	145.0204e-006	1.0357e-003	1.4413e+000	980.3922e-003	74.3931e+003
0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	966.8159e-003	1.0000e+000	62.3938e+003
0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	1.5812e+000	1.0000e+000	79.0325e+003
0.0000e+000	62.4544e-003	0.0000e+000	1.2246e-003	8.7454e-003	1.5630e+000	980.3922e-003	75.6605e+003
3.5399e+000	145.7149e+000	21.8246e+000	31.9259e+000	34.7228e+000	4.2322e+000	0.0000e+000	100.0000e+003
4.6558e-006	100.1477e+000	29.9739e-003	36.7203e-003	25.4924e-003	4.7687e+000	0.0000e+000	100.0000e+003
12.0732e-003	68.6941e-003	29.9086e-003	33.2557e-003	14.7985e-003	3.8335e+000	0.0000e+000	100.0000e+003
22.8377e-003	126.2812e-003	71.6255e-003	74.0414e-003	27.3709e-003	3.8131e+000	0.0000e+000	100.0000e+003
154.3976e-003	482.5881e-003	271.2720e-003	301.8647e-003	81.8759e-003	3.7512e+000	0.0000e+000	100.0000e+003
207.1918e-003	1.6092e+000	959.1882e-003	1.0146e+000	360.6573e-003	3.6268e+000	0.0000e+000	100.0000e+003
0.0000e+000	6.3860e+000	1.2031e+000	1.4921e+000	1.3936e+000	5.7399e+000	39.2157e-003	99.6035e+003
1.6712e-003	1.1599e+000	107.1532e-003	215.0082e-003	236.1691e-003	4.0074e+000	0.0000e+000	100.0000e+003
12.5611e-003	679.8688e-003	76.7777e-003	103.7386e-003	121.8233e-003	5.2634e+000	0.0000e+000	100.0000e+003
5.3568e-003	622.5032e-003	110.2922e-003	133.1736e-003	102.7890e-003	3.9960e+000	0.0000e+000	100.0000e+003
545.3840e-006	1.1272e+000	319.7169e-003	324.3033e-003	261.5521e-003	4.0731e+000	0.0000e+000	100.0000e+003
4.9185e-003	164.8553e-003	64.6664e-003	66.7014e-003	36.7610e-003	4.0265e+000	0.0000e+000	100.0000e+003
200.0000e+000	200.0000e+000	200.0000e+000	200.0000e+000	0.0000e+000	4.5444e+000	0.0000e+000	100.0000e+003
100.0000e+000	109.5085e+000	106.7013e+000	105.2036e+000	3.3676e+000	4.0294e+000	0.0000e+000	100.0000e+003
100.0000e+000	116.6492e+000	108.4410e+000	105.7919e+000	6.0347e+000	4.0998e+000	0.0000e+000	100.0000e+003
100.0106e+000	100.0666e+000	100.0343e+000	100.0361e+000	15.6246e-003	7.0187e+000	0.0000e+000	100.0000e+003
726.2501e-003	2.1466e+000	1.2954e+000	1.2991e+000	298.0258e-003	7.0969e+000	0.0000e+000	100.0000e+003
200.0000e+000	200.0000e+000	200.0000e+000	200.0000e+000	0.0000e+000	4.7344e+000	0.0000e+000	100.0000e+003
131.7460e+000	223.2605e+000	221.7606e+000	220.2899e+000	12.6568e+000	5.5254e+000	0.0000e+000	100.0000e+003
454.2890e+000	465.9100e+000	462.3348e+000	462.4321e+000	1.3268e+000	4.7635e+000	0.0000e+000	100.0000e+003

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(b) 30D

best	max	median	mean	std.	avg. running time	avg. success rate	avg. fitness evaluations
0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	4.6510e+000	1.0000e+000	228.1145e+003
0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	2.7796e+000	1.0000e+000	183.7866e+003
0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	1.9973e+000	1.0000e+000	146.9056e+003
0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	4.2927e+000	1.0000e+000	227.3627e+003
19.9961e+000	19.9998e+000	19.9988e+000	19.9985e+000	937.0649e-006	10.7520e+000	0.0000e+000	300.0000e+003
0.0000e+000	736.7390e-003	3.5145e-006	25.4306e-003	127.4504e-003	26.7279e+000	470.5882e-003	269.0232e+003
0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	1.8492e+000	1.0000e+000	127.9128e+003
0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	4.4108e+000	1.0000e+000	237.8004e+003
0.0000e+000	3.9798e+000	994.9591e-003	1.0340e+000	1.0139e+000	9.8669e+000	372.5490e-003	296.8047e+003
0.0000e+000	20.8192e-003	0.0000e+000	1.6329e-003	5.6529e-003	10.8645e+000	921.5686e-003	291.0214e+003
391.3953e+000	1.7950e+003	1.3545e+003	1.3299e+003	238.1878e+000	12.4449e+000	0.0000e+000	300.0000e+003
14.8405e-003	198.1835e-003	68.4121e-003	74.3818e-003	43.3112e-003	15.9375e+000	0.0000e+000	300.0000e+003
27.4266e-003	180.9125e-003	98.8273e-003	98.2172e-003	32.3538e-003	10.6576e+000	0.0000e+000	300.0000e+003
138.5906e-003	280.5360e-003	225.2436e-003	224.8504e-003	29.2085e-003	10.6724e+000	0.0000e+000	300.0000e+003
1.1115e+000	3.5862e+000	2.0528e+000	2.0251e+000	480.3418e-003	11.0714e+000	0.0000e+000	300.0000e+003
7.2759e+000	10.2225e+000	8.8725e+000	8.9370e+000	560.1742e-003	15.0967e+000	0.0000e+000	300.0000e+003
42.0670e+000	404.4388e+000	103.2886e+000	146.5290e+000	93.3879e+000	13.3588e+000	0.0000e+000	300.0000e+003
1.2197e+000	12.2036e+000	5.4079e+000	6.2046e+000	2.5498e+000	10.8584e+000	0.0000e+000	300.0000e+003
1.7986e+000	5.2310e+000	3.0316e+000	3.1484e+000	785.3341e-003	15.9171e+000	0.0000e+000	300.0000e+003
869.7283e-003	6.5262e+000	3.6223e+000	3.5147e+000	1.4509e+000	11.2904e+000	0.0000e+000	300.0000e+003
2.0646e+000	167.4012e+000	19.1394e+000	60.6751e+000	63.2493e+000	11.3255e+000	0.0000e+000	300.0000e+003
21.4276e+000	139.7242e+000	27.3739e+000	30.5170e+000	17.1620e+000	11.6366e+000	0.0000e+000	300.0000e+003
200.0000e+000	200.0000e+000	200.0000e+000	200.0000e+000	0.0000e+000	16.6211e+000	0.0000e+000	300.0000e+003
200.0000e+000	200.0000e+000	200.0000e+000	200.0000e+000	108.0773e-015	14.5992e+000	0.0000e+000	300.0000e+003
200.0000e+000	200.0000e+000	200.0000e+000	200.0000e+000	0.0000e+000	15.3768e+000	0.0000e+000	300.0000e+003
100.0436e+000	100.1409e+000	100.0909e+000	100.0934e+000	22.4109e-003	39.0175e+000	0.0000e+000	300.0000e+003
200.0000e+000	200.0000e+000	200.0000e+000	200.0000e+000	0.0000e+000	38.2623e+000	0.0000e+000	300.0000e+003
200.0000e+000	200.0000e+000	200.0000e+000	200.0000e+000	0.0000e+000	17.2592e+000	0.0000e+000	300.0000e+003
713.4030e+000	727.4283e+000	715.7155e+000	716.3864e+000	2.5967e+000	21.4213e+000	0.0000e+000	300.0000e+003
484.3610e+000	2.0968e+003	959.6584e+000	945.0139e+000	402.5501e+000	17.9287e+000	0.0000e+000	300.0000e+003

Figure 1: Screenshot of the Matlab Command Window for the 10D and 30D results obtained (where columns represent best, max, median, mean, std., average running time, average success rate and average fitness evaluations values, respectively)

As mentioned above, we have recorded the randomly generated seeds we used in the initial submission of the paper, as recorded in "**Results_Record\seeds**". Therefore, authors who have a computer with the following specifications can easily validate our results. Note that we ran the experiments on **MATLAB 8.5.0.197613 (R2015a)**. This was validated on more than one computer, which have the same specifications, at the University of New South Wales Canberra [1].

3.1   Computer Specifications:

- **Processor**: Intel(R) Core(TM) i7-3770 CPU @ 3.40GHz (8 CPUs), ~3.4GHz

- **Memory**: 16384MB RAM

- **Windows**: 7

4   Queries

If you have any comment or suggestion, please contact Dr. Saber Elsayed (s.elsayed@adfa.edu.au). You can also visit the following website for more updates

www.saberelsayed.net (Old version https://sites.google.com/site/saberelsayed3/)

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[1] users are referred to http://au.mathworks.com/matlabcentral/newsreader/view_thread/137512 to learn about consequences (and reasons) that may happen if the same programs are run on computers with different specifications, even if the seeds are the same.