

Comparing CRBA vs GDAHJ for calculating JSIM !

Inertial data of robot links are generated randomly

Results are formatted as:

[ DOF, time (GDAHJ), time (CRBA), error as:  $\sum(\sum(\text{abs}(A\_CRBA - A\_GDHJ))) / n^2$ ]

```
res=[2,878,116,1.38778e-16;  
3,943,209,2.96059e-16;  
4,1026,318,6.59195e-16;  
5,1127,442,7.36633e-16;  
6,1231,593,9.11308e-16;  
7,1346,756,1.1139e-15;  
8,1461,937,1.52829e-15;  
9,1580,1144,1.26177e-15;  
10,1694,1357,1.61537e-15;  
11,1828,1591,1.39707e-15;  
12,1946,1852,1.46758e-15;  
13,2082,2111,1.85322e-15;  
14,2225,2403,2.59154e-15;  
15,2368,2714,3.4062e-15;  
16,2512,3053,3.82441e-15;  
17,2656,3390,4.43393e-15;  
18,2821,3747,4.23161e-15;  
19,2982,4123,4.73121e-15;  
20,3143,4516,5.50952e-15;  
21,3307,4950,5.77033e-15;  
22,3486,5381,6.60497e-15;  
23,3709,5832,6.94136e-15;  
24,3836,6298,7.31441e-15;  
25,4026,6780,9.09308e-15;  
26,4204,7296,9.63106e-15;  
27,4404,7806,1.02536e-14;  
28,4589,8357,1.1373e-14;  
29,4831,8926,1.21291e-14;  
30,4996,9501,1.47543e-14]
```

Inertia matrix calculated using GDAHJ for 30DOF serially linked robot is:

[84.6091][74.9286][52.5202][24.9411][ ..... ][7.50994][2.44108][-0.414641][-1.18414][-0.70655]  
 [74.9286][81.1155][71.0102][49.1493][ ..... ][11.5619][5.78687][1.60412][-0.393601][-0.596791]  
 [52.5202][71.0102][75.8668][65.6276][ ..... ][13.5433][8.30051][3.63942][0.729921][-0.248566]  
 [24.9411][49.1493][65.6276][69.577][ ..... ][12.9049][9.23196][5.06542][1.83354][0.226164]  
 [0.758193][22.8879][44.8269][59.7738][ ..... ][9.93131][8.34924][5.46904][2.58588][0.682835]  
 [-13.2009][0.366974][20.4539][40.5691][ ..... ][5.62729][5.9938][4.76943][2.77654][0.988296]  
 [-13.8387][-12.0982][0.0449728][18.4187][ ..... ][1.38281][2.95496][3.23014][2.37464][1.0596]  
 [-2.44772][-11.8517][-10.7358][0.15113][ ..... ][-1.47387][0.2083][1.36392][1.53017][0.886264]  
 [16.0691][-0.425693][-9.72912][-9.2267][ ..... ][-2.09112][-1.39628][-0.236455][0.520107] [0.530144]  
 [35.0519][17.3027][1.33699][-7.96058][ ..... ][-0.347844][-1.3973][-1.08591][-0.341735][0.103907]  
 [48.3327][34.9466][17.7394][2.18527][ ..... ][3.12948][0.145833][-0.954075][-0.802143][-0.264524]  
 [52.1261][46.7655][33.5351][16.8188][ ..... ][7.18589][2.6886][0.0729502][-0.742836][-0.470357]  
 [45.9864][49.4194][43.5701][30.5793][ ..... ][10.518][5.38929][1.63244][-0.20999][-0.461649]  
 [32.6077][42.7906][45.0482][38.9563][ ..... ][12.0911][7.38522][3.21027][0.608156][-0.251934]  
 [16.6399][29.6896][38.187][39.6555][ ..... ][11.4601][8.06732][4.30912][1.44631][0.0871215]  
 [3.00055][14.6455][25.8283][33.1022][ ..... ][8.8948][7.26597][4.60481][2.04768][0.449848]  
 [-4.71963][2.2644][12.2308][21.9981][ ..... ][5.27514][5.29135][4.04198][2.24262][0.729468]  
 [-5.24229][-4.25993][1.52418][10.1696][ ..... ][1.7936][2.81939][2.84062][1.99631][0.84951]  
 [0.278649][-4.00768][-3.62514][1.16889][ ..... ][-0.434366][0.663847][1.41471][1.41204][0.784525]  
 [8.94743][1.65501][-2.70928][-2.87316][ ..... ][-0.726374][-0.489498][0.231891][0.691406][0.564538]  
 [17.303][9.824][2.73222][-1.77444][ ..... ][0.957945][-0.300367][-0.338791][0.065927][0.262878]  
 [22.5273][17.2259][9.90466][2.90533][ ..... ][4.01907][1.12566][-0.141894][-0.277048][-0.02803]  
 [23.2713][21.3587][15.8812][8.65248][ ..... ][7.42576][3.28352][0.72254][-0.250441][-0.22497]  
 [19.8629][21.2142][18.6252][13.0222][ ..... ][10.0584][5.44341][1.94132][0.111186][-0.277681]  
 [13.9083][17.3792][17.5615][14.5003][ ..... ][11.0743][6.89454][3.09826][0.669996][-0.18128]  
 [7.50994][11.5619][13.5433][12.9049][ ..... ][10.1763][7.17726][3.81426][1.23505][0.0255582]  
 [2.44108][5.78687][8.30051][9.23196][ ..... ][7.17726][6.22828][3.87064][1.62662][0.275141]  
 [-0.414641][1.60412][3.63942][5.06542][ ..... ][3.81426][3.87064][3.27593][1.73313][0.492761]  
 [-1.18414][-0.393601][0.729921][1.83354][ ..... ][1.23505][1.62662][1.73313][1.54292][0.619057]  
 [-0.70655][-0.596791][-0.248566][0.226164][ ..... ][0.0255582][0.275141][0.492761][0.619057][0.626042]

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[32.6077][42.7906][45.0482][38.9563][ ..... ][12.0911][7.38522][3.21027][0.608156][-0.251934]  
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[3.00055][14.6455][25.8283][33.1022][ ..... ][8.8948][7.26597][4.60481][2.04768][0.449848]  
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[-5.24229][-4.25993][1.52418][10.1696][ ..... ][1.7936][2.81939][2.84062][1.99631][0.84951]  
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