In [1]:
```
from os.path import join, dirname, basename, splitext, abspath
from glob import glob
import pandas as pd
import yaml
import platform
from datetime import timedelta
from IPython.display import display
from IPython.core.display import display, HTML
import platform
display(HTML("<style>.container { width:100% !important; }</style>"))

this_folder = dirname(__file__) if '__file__' in globals() else abspath('')
root_folder = dirname(dirname(this_folder))
def get_test_result_folder(testname = 'baseline'):
    return join(root_folder, 'test', 'testresults', 'XPS-15-9500', testname, 'CUTEst')

def color_negative_red(val):
    color = 'red' if val < 0 else 'black'
    return f'color: {color}'
def color_negative_red_positive_green(val):
    if val > 0:
        return 'color: green'
    elif val < 0:
        return 'color: red'
    else:
        return 'color: black'
```

In [2]:
```
def load_raw_data(folder):
    output_files = glob(join(folder, '*.yaml'))
    raw_data = {}
    for filename in output_files:
        with open(filename, 'r') as f:
            all_content = yaml.safe_load_all(f)
            content = next(all_content)
            name = splitext(basename(filename))[0]
            raw_data[name] = content
    return raw_data
```

In [3]:
```
def convert_data(raw_data):
    data = []
    for name, content in raw_data.items():
        element = {
            'name': name,
            'status': content['status'],
#             'time': timedelta(seconds=content['elapsed time']),
            'time': float(content['elapsed time']),
            'inner iterations': content['inner iterations'],
            'outer iterations': content['outer iterations'],
            'inner convergence failures': content['inner convergence failures'],
            'f': float(content['f']),
            'ε': float(content['ε']),
            'δ': float(content['δ']),
            'f evaluations': content['counters']['f'],
            'grad_f evaluations': content['counters']['grad_f'],
            'g evaluations': content['counters']['g'],
            'grad_g evaluations': content['counters']['grad_g'],
            'linesearch failures': content['linesearch failures'],
            'L-BFGS failures': content['L-BFGS failures'],
            'L-BFGS rejected': content['L-BFGS rejected'],
            '‖Σ‖': content['‖Σ‖'],
            '‖x‖': content['‖x‖'],
            '‖y‖': content['‖y‖'],
        }
        data.append(element)
    df = pd.DataFrame(data)
    # df.sort_values(['status', 'inner iterations'], inplace=True, ignore_index=True)
    # df.sort_values(['name'], inplace=True, ignore_index=True)
    df.set_index('name', inplace=True)
    df.sort_index(inplace=True)

#     df['rel linesearch failures'] = df['linesearch failures'] / df['inner iterations']
    return df
```

In [4]:
```
base_folder = get_test_result_folder('baseline')
new_folder = get_test_result_folder('upd-lipschitz-ls')
```

In [5]:
```
base_raw = load_raw_data(base_folder)
new_raw = load_raw_data(new_folder)
```

In [6]:
```
base_df = convert_data(base_raw)
new_df = convert_data(new_raw)
```

In [7]:
```
pd.set_option('display.max_rows', None)
new_df
```

Out[7]:

name	status	time	inner iterations	outer iterations	inner convergence failures	f	ε	δ	f evaluations	grad_f evaluations	g evaluations	grad_g evaluations	linesearch failures	L-BFGS failures	L-BFGS rejected	‖Σ‖	‖x‖	‖y‖
3PK	Converged	0.530828	77487	79	76	1.720119e+00	8.218430e-06	0.000000e+00	156057	155356	156215	155356	0	0	0	0.000000e+00	369.613046	0.000000e+00
A4X12	MaxTime	90.220912	88944	90	88	4.509074e-01	6.782443e+00	6.763965e-06	178926	178348	179106	178348	0	0	0	6.929378e+10	5.995788	6.307587e+05
A5ESSNDL	MaxTime	96.005144	7523	10	6	1.968820e-06	8.314276e-03	1.129296e-04	15730	15380	15750	15380	0	0	0	8.742505e+02	474.682459	1.703736e-02
A5NSDSDM	Converged	18.797764	9287	11	8	0.000000e+00	9.708457e-06	1.018720e-06	18661	18624	18683	18624	0	0	0	6.052366e+02	158.538408	4.843200e-02
A5NSSNSM	Converged	9.580745	9287	11	8	0.000000e+00	9.708457e-06	1.018720e-06	18661	18624	18683	18624	0	0	0	6.052366e+02	158.538408	4.843200e-02
A5NSSSSL	MaxTime	97.024743	3805	4	3	4.255219e-06	1.677482e-02	1.545677e-02	7815	7711	7823	7711	0	0	0	3.490440e+02	493.42708	1.160185e-01
ACOPP14	MaxIter	85.258758	198485	200	198	8.081523e+03	6.843232e-02	2.147762e-07	3088711	1738997	3089111	1738997	0	0	164714	1.020076e+06	4.466694	1.492883e+04
ACOPP30	MaxIter	30.270504	198964	200	198	5.778537e+02	5.998761e+02	8.320505e-07	401335	399155	401735	399155	0	0	0	1.150848e+09	5.604058	2.687248e+03
ACOPR14	MaxIter	63.908112	198279	200	197	8.081529e+03	5.478113e-02	1.446608e-07	2513840	1451202	2514240	1451202	1	0	165763	4.265989e+05	4.388936	1.493134e+04
AIRCRFTA	Converged	0.000484	156	6	0	0.000000e+00	7.207586e-06	5.302163e-07	348	330	360	330	0	0	0	1.140857e+02	0.159019	5.141171e-07
AIRPORT	MaxTime	90.057608	53139	57	53	4.795270e+04	4.125447e-04	7.731995e-08	1010244	557315	1010358	557315	0	0	51107	1.181124e+06	34.331082	5.031360e+03
ALLINITA	Converged	0.088955	3134	13	3	3.325882e+01	1.937997e-07	4.514688e-06	52913	29561	52939	29561	0	0	2906	5.003964e+08	2.250238	4.412754e+03
ALLINITC	Converged	0.203884	15170	25	15	3.047620e+01	3.617481e-06	5.323762e-07	95366	62588	95416	62588	0	0	14715	1.000000e+09	2.285991	1.909921e+04
ALSOTAME	Converged	0.000108	19	5	0	8.208500e-02	2.455075e-11	1.313510e-08	87	68	97	68	0	0	0	1.000000e+02	1.581139	8.208500e-02
ANTWERP	MaxIter	2.858412	200000	200	200	2.488324e+04	8.012443e+02	5.456487e-07	425570	412009	425970	412009	0	0	0	1.203653e+10	82583.604853	1.449386e+05
AVGASA	Converged	0.000487	112	6	0	-4.631927e+00	8.571126e-06	6.722551e-06	248	242	260	242	0	0	0	8.122607e+01	1.401031	2.248488e+00
AVGASB	Converged	0.000583	134	7	0	-4.483222e+00	5.500549e-06	4.774360e-06	302	290	316	290	0	0	0	1.563551e+02	1.451248	1.940813e+00
AVION2	MaxIter	2.326070	200000	200	200	5.043179e+08	6.634414e+06	1.221963e-06	450627	423941	451027	423941	0	0	0	9.091129e+12	44064.299158	4.200015e+05
BA-L1	Converged	0.006646	95	6	0	0.000000e+00	8.284544e-06	8.442953e-09	263	208	275	208	0	0	0	5.713008e+01	987.932379	8.967014e-09
BA-L1SP	Converged	0.019317	88	6	0	0.000000e+00	8.939834e-06	2.923907e-08	201	194	213	194	0	0	0	4.419575e+01	0.299563	1.356287e-08
BARDNE	MaxIter	1.550988	193105	200	193	0.000000e+00	9.183478e+06	8.046706e-02	940669	660384	941069	660384	0	0	191392	2.558059e+15	2.609954	8.976238e+13
BATCH	MaxIter	7.620435	200000	200	200	2.591806e+05	1.569128e+00	2.227842e-06	1457745	926419	1458145	926419	2820	0	30141	1.436772e+06	24.395798	1.495323e+05
BEALENE	Converged	0.000226	49	6	0	0.000000e+00	3.791141e-06	1.672278e-07	132	117	144	117	0	0	0	8.916820e+01	3.041381	3.716883e-02
BIGGS6NE	MaxIter	2.547240	192232	200	192	0.000000e+00	3.223430e+06	3.804578e-02	791308	585433	791708	585433	0	0	190599	3.326107e+15	18.653676	7.512366e+13
BIGGSC4	Converged	0.000756	121	6	0	-2.450000e+01	5.128197e-06	3.954541e-06	912	584	924	584	0	0	0	6.322338e+02	7.035624	4.636807e+00
BOOTH	Converged	0.000090	13	5	0	0.000000e+00	1.220847e-08	1.313944e-06	40	41	50	41	0	0	0	1.411385e+02	3.162278	1.758281e-09
BOX3NE	Converged	0.000385	55	6	0	0.000000e+00	5.687824e-06	5.806736e-08	146	128	158	128	0	0	0	1.031286e+03	10.099509	6.308137e-02
BOXBOD	NotFinite	0.000249	2	0	1	0.000000e+00	NaN	NaN	6	7	7	7	0	0	0	2.449490e+00	1.414215	0.000000e+00
BRITGAS	Converged	0.619518	3253	7	2	0.000000e+00	9.771528e-06	1.725158e-06	6597	6543	6611	6543	0	0	0	5.326927e+02	54.845485	2.665215e-05
BROWNBSNE	Converged	0.000124	17	5	0	0.000000e+00	4.991785e-06	3.492460e-10	237	50	247	50	0	0	0	1.732051e+00	1000000.0	1.746230e-09
BT1	Converged	0.000115	21	5	0	-1.000027e+00	3.512176e-07	2.665500e-07	84	67	94	67	0	0	0	1.000000e+03	1.0	9.950000e+01
BT10	Converged	0.000182	70	7	0	-1.000003e+00	2.971082e-06	1.331632e-06	167	161	181	161	0	0	0	1.058462e+02	1.41422	1.414198e+00
BT11	Converged	0.000368	142	7	0	8.248888e-01	7.795113e-06	1.756319e-06	306	305	320	305	0	0	0	7.305078e+02	1.788412	1.998434e+00
BT12	Converged	0.000476	180	6	0	6.188119e+00	4.103010e-07	1.715887e-08	408	378	420	378	0	0	0	7.136873e+02	34.974921	4.950494e-01
BT13	Converged	0.006075	1728	6	1	0.000000e+00	6.575428e-06	1.761411e-10	8345	5890	8357	5890	0	0	0	1.000000e+02	0.000009	5.724474e-02
BT2	Converged	0.000503	181	6	0	3.256820e-02	3.263298e-06	4.375078e-10	451	396	463	396	0	0	0	1.000000e+02	2.238252	1.072677e-02
BT3	Converged	0.000251	90	6	0	4.092954e+00	4.993645e-06	7.212189e-06	206	198	218	198	0	0	0	1.113934e+02	1.061903	6.679506e+00
BT4	Converged	0.000282	103	7	0	-4.551053e+01	3.600484e-06	1.707324e-06	250	230	264	230	0	0	0	7.664839e+01	5.0	1.637374e+01
BT5	Converged	0.020897	4130	10	4	9.617152e+02	3.477018e-06	2.926144e-08	25982	17062	26002	17062	0	0	3341	4.031501e+01	5.0	1.253975e+00
BT6	Converged	0.000830	163	6	0	2.770448e-01	6.941240e-06	1.057827e-07	346	345	358	345	0	0	0	1.005153e+02	2.809451	6.416401e-02
BT7	Converged	0.005821	2267	13	2	3.064991e+02	6.353834e-06	4.638192e-07	4761	4622	4787	4622	0	0	1893	1.486843e+05	2.958037	1.885731e+03
BT8	Converged	0.000174	60	6	0	1.000000e+00	7.292121e-06	3.474568e-08	140	140	152	140	0	0	0	1.192491e+01	1.0	1.016640e+00
BT9	Converged	0.000228	103	7	0	-1.000003e+00	5.461454e-06	2.984141e-06	233	227	247	227	0	0	0	6.887232e+02	1.414223	1.414195e+00
BYRDSPHR	Converged	0.000305	81	6	0	-4.683300e+00	6.714868e-06	2.252757e-07	384	283	396	283	0	0	0	6.441297e+01	3.0	7.270278e-01
C-RELOAD	Converged	4.465177	19938	23	19	-1.016152e+00	9.247353e-06	1.152703e-07	41835	40857	41881	40857	0	0	0	1.979600e+04	10.979025	4.098650e+00
CANTILVR	Converged	0.000244	69	6	0	1.339956e+00	2.689272e-06	2.955095e-07	210	156	222	156	0	0	0	1.000000e+02	10.073384	4.466504e-01
CBS	MaxTime	90.073239	32000	32	32	1.114056e+05	1.493529e+01	1.285575e-03	85624	74784	85688	74784	0	0	0	2.630139e+04	27663.88435	1.932884e+01
CHACONN1	Converged	0.000188	52	6	0	1.952225e+00	9.045071e-06	1.364848e-06	122	122	134	122	0	0	0	3.251185e+01	2.432652	7.139087e-01
CHACONN2	Converged	0.000206	66	6	0	2.000000e+00	3.139227e-06	7.787767e-08	148	150	160	150	0	0	0	1.137590e+02	2.44949	6.236091e-01
CLEUVEN7	MaxTime	90.167317	85680	87	85	6.835966e+02	1.545719e+00	1.146030e-05	197869	184601	198043	184601	0	0	0	1.434145e+06	19.535207	5.977112e+01
CLUSTER	Converged	0.000196	40	7	0	0.000000e+00	1.332904e-08	3.651261e-06	165	113	179	113	0	0	0	6.191062e+03	1.026467	6.997659e-08
COATINGNE	MaxIter	15.039681	198509	200	198	0.000000e+00	1.838199e+11	1.824155e-01	397801	397619	398201	397619	0	0	0	1.224556e+16	19.554061	7.017957e+14
CONCON	MaxIter	1.582787	200000	200	200	-6.230637e+03	1.986840e+00	6.599294e-08	744059	570823	744459	570823	0	0	51145	1.552335e+07	2762.167879	7.621328e-01
CONGIGMZ	Converged	0.000469	129	7	0	2.799999e+01	1.693330e-06	1.231208e-06	523	388	537	388	0	0	0	1.576905e+01	28.913655	8.062256e+00
COOLHANS	MaxIter	1.423889	196197	200	196	0.000000e+00	6.608798e+09	5.249943e-04	682840	534506	683240	534506	0	0	193872	2.828427e+15	1.803613	8.551076e+11
COOLHANSLS	MaxIter	0.831902	195171	200	195	2.997478e-05	4.845191e-05	0.000000e+00	397322	390995	397722	390995	1	0	194996	0.000000e+00	1.479257	0.000000e+00
CORE2	MaxIter	5.708921	200000	200	200	7.615559e+01	2.304222e+11	1.662282e-02	406795	402676	407195	402676	0	0	0	8.959034e+15	13201.929943	4.636147e+13
CRESC50	NotFinite	0.002209	31	0	1	2.882191e+00	NaN	NaN	74	66	75	66	0	0	0	1.000000e+01	40.408036	0.000000e+00
CUBENE	Converged	0.000139	66	6	0	0.000000e+00	5.833230e-07	7.726958e-08	174	156	186	156	0	0	0	1.044260e+02	1.414213	6.985986e-09
DALLASM	MaxIter	70.936111	198649	200	197	-4.819819e+04	1.482897e-04	8.502961e-07	737325	561369	737725	561369	3	0	171009	6.980828e+03	144.257657	1.366679e+03
DALLASS	MaxIter	34.117246	198875	200	198	-3.239322e+04	7.361767e-05	6.667659e-07	1925129	1156576	1925529	1156576	1332	0	94170	1.786559e+02	184.093581	6.591052e+02
DANIWOOD	MaxIter	0.753633	195056	200	195	0.000000e+00	1.205397e+07	3.683666e-02	511395	449011	511795	449011	0	0	194509	2.449490e+15	3.936226	6.570835e+13
DANWOOD	MaxIter	1.032289	195062	200	195	0.000000e+00	2.034780e+07	3.683666e-02	537240	462060	537640	462060	0	0	194568	2.449490e+15	3.971828	6.570835e+13
DECONVBNE	Converged	0.148484	3950	12	2	0.000000e+00	8.126233e-06	1.976211e-06	9018	8472	9042	8472	0	0	0	4.819366e+02	4.518749	1.069367e-02

name	status	time	inner iterations	outer iterations	inner convergence failures	f	ε	δ	f evaluations	grad_f evaluations	g evaluations	grad_g evaluations	linesearch failures	L-BFGS failures	L-BFGS rejected	‖Σ‖	‖x‖	‖y‖
DECONVC	Converged	0.054867	818	6	0	1.134614e-08	5.766452e-06	9.099929e-07	1904	1781	1916	1781	0	0	0	1.000000e+01	4.536104	3.356039e-07
DECONVNE	Converged	0.075019	2132	12	0	0.000000e+00	9.487293e-06	5.739847e-06	4297	4303	4321	4303	0	0	0	3.512375e+04	4.521505	3.921639e-02
DECONVU	Converged	0.003326	92	6	0	1.155378e-07	7.496512e-06	0.000000e+00	199	202	211	202	0	0	0	0.000000e+00	4.481931	0.000000e+00
DEGENLPA	MaxIter	0.916358	189756	200	189	3.136919e+00	1.762802e+03	7.991664e-07	432505	404391	432905	404391	0	0	7516	5.238215e+09	0.558667	1.793603e+02
DEGENLPB	MaxIter	0.994870	189998	200	189	-2.975285e+01	4.943053e+03	1.365574e-13	539293	457720	539693	457720	1052	0	20025	3.392720e+15	0.335462	1.022110e+02
DEMBO7	MaxIter	4.258142	194260	200	193	1.749111e+02	1.458550e-03	1.622386e-08	1552247	966570	1552647	966570	0	0	189707	9.628455e+05	866.703436	5.504294e+02
DEMYMALO	Converged	0.000190	69	6	0	-3.000001e+00	7.508331e-06	2.599738e-06	238	171	250	171	0	0	0	1.667995e+01	4.242642	5.773515e-01
DIPIGRI	Converged	0.136018	19175	24	19	6.806301e+02	8.799056e-06	7.139007e-06	131179	84529	131227	84529	0	0	18595	4.837632e+01	5.704029	1.197848e+00
DISC2	Converged	0.009985	1151	6	0	1.562497e+00	8.720488e-06	6.940442e-06	2341	2322	2353	2322	0	0	0	8.272847e+01	28.277221	5.821509e-01
DISCS	Converged	0.384085	13993	23	8	1.200006e+01	5.997397e-06	8.095675e-06	37771	32777	37817	32777	1	0	47	4.557977e+04	14.142252	7.909874e-01
DIXCHLNG	Converged	0.006091	450	10	0	8.226970e-08	5.120984e-06	7.102124e-06	1001	937	1021	937	0	0	0	1.616197e+04	3.162278	1.933652e-02
DNIEPER	MaxIter	9.833934	197809	200	197	1.874401e+04	3.682609e-02	1.577365e-07	2015769	1202017	2016169	1202017	0	0	188977	7.654075e+04	192.944743	4.591815e+03
DUAL1	Converged	0.094314	290	6	0	3.501294e-02	8.898649e-06	6.299042e-07	613	607	625	607	0	0	0	1.000000e+01	0.193475	3.704729e-02
DUAL2	Converged	0.068216	179	6	0	3.373368e-02	6.833856e-06	3.515893e-07	376	377	388	377	0	0	0	1.000000e+01	0.133686	3.599682e-02
DUAL3	Converged	0.094369	193	6	0	1.357558e-01	8.818535e-06	3.213409e-08	402	404	414	404	0	0	0	1.000000e+02	0.130345	1.458489e-01
DUAL4	Converged	0.047209	51	6	0	7.460910e-01	6.543196e-06	4.698586e-07	118	120	130	120	0	0	0	1.000000e+01	0.144259	8.387206e-01
DUALC1	Converged	0.051866	1115	11	1	6.155180e+03	7.814218e-06	6.943324e-06	2433	2323	2455	2323	0	0	927	3.786999e+04	0.647609	1.032973e+04
DUALC2	Converged	0.135123	3060	9	3	3.551306e+03	4.489525e-06	5.327575e-08	6428	6230	6446	6230	0	0	2916	5.108433e+04	0.747151	4.725807e+03
DUALC5	Converged	0.057481	1080	7	1	4.272326e+02	7.800884e-07	1.203119e-08	2232	2189	2246	2189	0	0	981	1.000001e+04	0.519302	4.600655e+02
DUALC8	MaxIter	32.326171	196090	200	196	1.830936e+04	4.957510e-03	2.916182e-09	801228	593937	801628	593937	0	0	195460	1.000000e+05	0.635296	3.321141e+04
EG2	Converged	0.003617	6	4	0	-9.989474e+02	7.387914e-13	0.000000e+00	29	24	37	24	0	0	0	0.000000e+00	0.570751	0.000000e+00
EQC	Converged	0.092359	1001	2	1	-8.295477e+02	0.000000e+00	0.000000e+00	37934	19972	37938	19972	0	0	0	1.732051e+00	0.876608	0.000000e+00
ERRINBAR	MaxIter	1.762705	199566	200	199	3.117059e+01	7.549296e-01	2.109347e-08	1277602	836472	1278002	836472	0	0	162477	9.834788e+05	1764.689631	5.523656e-02
EXPFITA	Converged	0.005064	454	6	0	1.136612e-03	9.100029e-06	4.919368e-07	1403	1138	1415	1138	0	0	0	1.709086e+02	15.088657	3.851619e-03
EXPFITB	Converged	0.019636	558	8	0	5.019357e-03	6.197229e-06	8.592817e-07	1327	1212	1343	1212	0	0	0	1.167050e+02	14.657887	1.426474e-02
EXPFITC	MaxIter	68.033419	194378	200	194	2.330259e-02	2.331579e-05	9.054419e-07	1157660	770878	1158060	770878	0	0	190882	6.770601e+03	14.588323	8.175375e-02
EXPLIN	MaxIter	10.925847	198083	200	198	-7.192467e+07	6.441750e-04	0.000000e+00	498489	444429	498889	444429	0	0	196829	0.000000e+00	341.120086	0.000000e+00
EXPLIN2	NotFinite	0.019674	41	0	1	9.999999e+01	inf	0.000000e+00	151	108	152	108	0	0	0	0.000000e+00	0.0	0.000000e+00
EXPQUAD	NotFinite	0.018560	7	0	1	9.999999e+01	inf	0.000000e+00	22	17	23	17	0	0	0	0.000000e+00	0.0	0.000000e+00
EXTROSNBNE	Converged	1.058400	5284	10	5	-1.999995e+00	9.638074e-06	6.009825e-08	10714	10650	10734	10650	0	0	0	2.528515e+02	4.038787	5.773570e-02
FCCU	Converged	0.001187	187	7	0	1.114909e+01	5.450708e-06	4.915018e-06	420	395	434	395	0	0	0	1.869798e+02	62.693439	5.243036e+00
FEEDLOC	Converged	0.289997	3913	7	1	0.000000e+00	5.883862e-06	5.254815e-07	9332	8560	9346	8560	0	0	0	1.826045e+02	80.195044	1.933070e+00
FERRISDC	Converged	0.037257	0	1	0	-4.958966e-13	5.051662e-07	1.664442e-07	3	3	5	3	0	0	0	1.449138e+01	0.0	4.923500e-07
FLETCHER	Converged	0.000356	118	7	0	1.165685e+01	2.968983e-06	8.224130e-07	367	294	381	294	0	0	0	1.140367e+03	5.490186	8.363076e+00
FLOSP2TM	MaxTime	90.897544	82000	82	82	0.000000e+00	1.236373e+15	9.787395e+00	165703	164246	165867	164246	0	0	0	2.886105e+13	27.390202	2.381049e+13
FREURONE	MaxIter	0.262325	196045	200	196	0.000000e+00	4.706327e+09	4.948952e+00	464367	425275	464767	425275	0	0	195923	1.414214e+15	11.44796	6.998877e+15
GAUSSELM	Converged	91.651104	4077	7	2	-1.000040e+00	9.646342e-06	4.763477e-06	8250	8177	8264	8177	0	0	0	4.957875e+02	28.636184	2.350119e+00
GENROSENE	MaxTime	90.036479	40493	42	40	0.000000e+00	8.792014e-02	5.630181e+00	822684	450939	822768	450939	1576	0	23144	2.769365e+10	31.548143	2.869365e+10
GIGOMEZ1	Converged	0.000223	78	6	0	-3.000000e+00	3.013967e-06	1.615270e-07	223	185	235	185	0	0	4	1.696091e+01	4.242641	5.773495e-01
GIGOMEZ2	Converged	0.000196	65	6	0	1.952225e+00	6.146984e-06	8.984661e-08	149	148	161	148	0	0	0	1.009950e+02	2.432652	7.139090e-01
GIGOMEZ3	Converged	0.000218	69	6	0	2.000000e+00	7.663418e-07	4.772265e-07	172	162	184	162	0	0	0	9.811253e+01	2.44949	6.236093e-01
GILBERT	Converged	0.296711	80	8	0	2.459468e+03	6.810466e-06	1.435904e-06	725	439	741	439	0	0	0	1.000000e+03	1.000001	4.023330e+01
GMNCASE1	Converged	1.805480	1355	12	0	2.669347e-01	5.930342e-06	1.699472e-07	2753	2746	2777	2746	0	0	0	3.348584e+04	0.592716	2.853429e+01
GMNCASE2	Converged	6.611189	3903	14	0	-9.944532e-01	7.875607e-06	2.744001e-06	7854	7848	7882	7848	0	0	0	2.323836e+04	0.524146	1.986266e+01
GMNCASE3	Converged	4.942514	3507	15	0	1.524677e+00	8.416767e-06	7.193234e-06	7072	7059	7102	7059	0	0	0	4.580507e+04	0.556835	3.651910e+01
GMNCASE4	MaxTime	90.904258	4483	9	4	5.321243e+03	6.353323e-05	6.654126e-01	170110	89452	170128	89452	0	0	2990	3.573276e+03	12.024856	2.070112e+03
GOFFIN	Converged	0.023455	461	6	0	-1.097074e-07	4.913487e-06	1.194639e-07	1384	1148	1396	1148	0	0	0	6.224416e+01	0.0	1.414211e-01
GOULDQP1	Converged	0.347009	10954	16	10	-3.485333e+03	8.696890e-06	1.370248e-06	197719	109645	197751	109645	0	0	6583	7.560076e+02	127.145588	3.343181e+02
GOULDQP2	Converged	0.049777	0	1	0	1.601722e-12	3.468504e-08	6.784334e-09	33	3	35	3	0	0	0	9.999500e+01	276.229811	2.612256e-07
GOULDQP3	Converged	2.110106	323	6	0	2.379100e-05	6.774130e-06	6.383185e-07	703	664	715	664	0	0	0	8.873650e+03	276.234866	6.898089e-03
GRIDGENA	NotFinite	0.003797	0	1	1	NaN	inf	0.000000e+00	3	5	6	5	0	0	0	0.000000e+00	419.204714	0.000000e+00
GRIDNETA	MaxTime	91.133699	35846	39	34	3.108729e+02	7.451888e-03	3.687713e-02	71927	71820	72005	71820	0	0	0	1.599717e+04	50.392446	7.646960e+02
GRIDNETH	MaxTime	105.387188	23845	29	11	2.064805e+02	1.577794e-05	3.636162e-07	84911	66268	84969	66268	0	0	129	4.761547e+04	25.033817	1.481571e+02
GRIDNETI	MaxTime	92.928741	27691	34	22	2.422507e+02	6.647291e-04	7.566570e-03	55749	55565	55817	55565	0	0	0	8.999630e+03	31.458565	2.944834e+02
GROUPING	NotFinite	0.076323	2335	6	1	2.506553e+00	inf	2.115577e-02	6100	5345	6113	5345	0	0	1	2.448466e+03	4.468782	2.082531e+01
GROWTH	MaxIter	2.398585	196401	200	196	0.000000e+00	9.974929e+09	5.545672e-01	828137	608284	828537	608284	0	0	194358	3.316625e+15	1.538784	1.001964e+15
HADAMARD	MaxIter	68.019615	197021	200	197	7.181291e-01	9.940332e+05	1.809524e+01	427380	409030	427780	409030	0	0	196853	1.449138e+16	6.213769	8.507700e+16
HAHN1	MaxIter	41.171830	193656	200	193	0.000000e+00	6.449611e+06	1.442830e+00	1906783	1142694	1907183	1142694	0	0	180687	1.288632e+16	21288733.545069	5.741334e+15
HAIFAL	MaxTime	91.097686	12001	13	12	-1.063707e+01	1.327574e+00	1.564518e-02	25813	24864	25839	24864	0	0	18	1.171425e+03	91.532964	4.731945e-01
HAIFAM	MaxIter	17.792251	199005	200	199	-7.938428e+00	1.548131e+00	4.268440e-06	572841	484013	573241	484013	0	0	393	2.179891e+06	24.832906	5.925170e-01
HAIFAS	Converged	0.000407	72	6	0	-4.500001e-01	8.161784e-06	2.474936e-07	247	170	259	170	0	0	0	1.056965e+02	1.394739	6.123762e-01
HALDMADS	Converged	0.008039	755	13	0	1.211392e-04	5.932318e-06	3.008216e-06	1649	1552	1675	1552	0	0	0	4.728314e+04	1.297289	4.267201e-01
HANGING	MaxTime	90.829820	47912	49	47	-3.147406e+04	1.413929e-03	5.210188e-07	330437	212764	330535	212764	0	0	4744	2.560819e+05	1422.949535	3.818656e+02
HARKERP2	Converged	13.140290	886	4	0	-5.000000e-01	0.000000e+00	0.000000e+00	3872	2813	3880	2813	0	0	0	0.000000e+00	1	0.000000e+00
HATFLDDNE	MaxIter	2.252877	190188	200	190	0.000000e+00	5.141760e+05	1.867970e-04	1078873	727941	1079273	727941	0	0	188876	2.828482e+15	3.441898	2.591723e+11
HATFLDENE	MaxIter	3.428557	191181	200	191	0.000000e+00	2.713594e+06	7.997179e-04	838175	608252	838575	608252	0	0	189889	4.123106e+15	3.857777	1.652285e+12
HATFLDF	Converged	0.001224	191	6	0	0.000000e+00	5.757712e-07	4.054420e-08	1792	1090	1804	1090	0	0	0	8.544017e+02	0.583391	6.070167e-07

name	status	time	inner iterations	outer iterations	inner convergence failures	f	ε	δ	f evaluations	grad_f evaluations	g evaluations	grad_g evaluations	linesearch failures	L-BFGS failures	L-BFGS rejected	‖Σ‖	‖x‖	‖y‖
HATFLDFLNE	MaxIter	0.367540	196017	200	196	0.000000e+00	6.610966e+07	6.337356e-03	473842	430959	474242	430959	0	0	195265	1.732051e+15	143.455287	7.762870e+12
HATFLDG	Converged	0.003207	327	6	0	0.000000e+00	8.280937e-06	2.892455e-06	678	672	690	672	0	0	0	1.575977e+02	1.414216	1.490174e-05
HATFLDH	Converged	0.000258	89	6	0	-2.450000e+01	5.525776e-06	4.099515e-06	234	214	246	214	0	0	0	5.796030e+02	7.035624	4.636811e+00
HEART6	Converged	0.008234	1657	6	0	0.000000e+00	5.517395e-06	1.996276e-08	4669	3845	4681	3845	0	0	0	1.370834e+02	20.573945	1.986407e-06
HEART8	MaxIter	1.106661	197251	200	197	0.000000e+00	9.482478e+10	7.459915e-01	707866	548709	708266	548709	0	0	192448	2.529876e+15	74.943508	1.065317e+15
HELIXNE	Converged	0.000211	62	6	0	0.000000e+00	1.976825e-06	5.384959e-08	154	149	166	149	0	0	0	1.023135e+02	1.0	1.048434e-06
HELSBY	MaxTime	90.055061	144000	146	144	3.654642e+01	7.076675e+06	1.599360e-05	292503	290334	292795	290334	0	0	0	1.741827e+16	3198.988167	1.049020e+11
HET-Z	Converged	0.006084	25	9	0	9.999938e-01	1.776912e-12	9.822704e-06	71	77	89	77	0	0	0	3.368341e+04	0.999994	6.891940e-01
HIE1327D	MaxIter	64.062934	198781	200	198	5.189385e+02	5.914572e-03	1.222862e-06	400690	399167	401090	399167	0	0	0	5.746047e+04	1462.196612	1.300492e+00
HIE1372D	Converged	4.760086	34275	36	33	2.779871e+02	9.618839e-06	6.150329e-07	68902	68754	68974	68754	0	0	0	6.180287e+03	1074.815379	8.242893e-01
HILBERTA	Converged	0.000042	6	6	0	3.570853e-13	2.023390e-07	0.000000e+00	29	30	41	30	0	0	0	0.000000e+00	0.000003	0.000000e+00
HILBERTB	Converged	0.000122	4	6	0	1.241713e-13	8.001450e-06	0.000000e+00	21	26	33	26	0	0	0	0.000000e+00	0.0	0.000000e+00
HIMMELBA	Converged	0.000179	20	6	0	0.000000e+00	1.311452e-06	1.336273e-07	57	58	69	58	0	0	0	1.006906e+02	7.81025	7.593766e-08
HIMMELBB	Converged	0.000108	28	6	0	7.552349e-13	2.366738e-06	0.000000e+00	90	74	102	74	0	0	0	0.000000e+00	0.804673	0.000000e+00
HIMMELBC	Converged	0.000064	12	5	0	0.000000e+00	2.910597e-06	2.091201e-07	39	39	49	39	0	0	0	1.204661e+01	3.605551	6.493683e-07
HIMMELBCLS	Converged	0.000046	8	5	0	2.424379e-19	2.008203e-08	0.000000e+00	29	31	39	31	0	0	0	0.000000e+00	3.605551	0.000000e+00
HIMMELBD	MaxIter	0.289278	196067	200	196	0.000000e+00	3.141232e+10	2.432422e+00	545399	466883	545799	466883	0	0	195841	1.001301e+15	0.399575	2.432455e+15
HIMMELBE	Converged	0.000113	32	6	0	0.000000e+00	8.179309e-06	3.181678e-06	81	82	93	82	0	0	0	1.291960e+01	1.732054	5.535215e-06
HIMMELBF	MaxIter	0.349900	195085	200	195	3.185717e+02	3.032839e-05	0.000000e+00	398982	391807	399382	391807	0	0	194984	0.000000e+00	1713.571317	0.000000e+00
HIMMELBFNE	MaxIter	0.619164	199069	200	199	0.000000e+00	2.996771e+11	1.000000e+04	572755	482911	573155	482911	0	0	197659	2.242863e+15	4420.472576	1.014113e+19
HIMMELBG	Converged	0.000092	6	6	0	4.162127e-13	6.966051e-06	0.000000e+00	32	30	44	30	0	0	0	0.000000e+00	0.0	0.000000e+00
HIMMELBH	Converged	0.000079	9	5	0	-1.000000e+00	4.232670e-06	0.000000e+00	32	33	42	33	0	0	0	0.000000e+00	1.414214	0.000000e+00
HIMMELBI	NotFinite	0.302787	6278	7	6	-1.735570e+03	inf	8.675181e-04	16762	14651	16777	14651	0	0	0	4.469830e+02	229.439061	2.836057e-01
HIMMELBJ	NotFinite	0.036927	968	1	1	-3.099520e+03	NaN	NaN	1940	1942	1943	1942	0	0	0	1.765821e+01	46.988659	3.459341e+01
HIMMELBK	Converged	0.036752	1297	6	0	5.181434e-02	6.092523e-06	3.000162e-07	3567	3073	3579	3073	0	0	0	1.109841e+02	0.72815	5.617594e-02
HIMMELP1	Converged	0.000082	15	6	0	-6.205394e+01	2.400113e-06	0.000000e+00	120	57	132	57	0	0	0	0.000000e+00	106.653173	0.000000e+00
HIMMELP2	Converged	0.000145	15	6	0	-6.205394e+01	2.400113e-06	0.000000e+00	199	57	211	57	0	0	0	1.000000e+00	106.653173	0.000000e+00
HIMMELP3	Converged	0.000094	6	2	0	-5.901318e+01	0.000000e+00	0.000000e+00	89	27	93	27	0	0	0	1.414214e+00	99.247166	0.000000e+00
HIMMELP4	Converged	0.000103	6	2	0	-5.901318e+01	0.000000e+00	0.000000e+00	89	27	93	27	0	0	0	1.732051e+00	99.247166	0.000000e+00
HIMMELP5	Converged	0.000087	8	2	0	-5.901318e+01	0.000000e+00	0.000000e+00	39	25	43	25	0	0	0	1.732051e+00	99.247166	0.000000e+00
HIMMELP6	Converged	0.000084	8	2	0	-5.901318e+01	0.000000e+00	0.000000e+00	39	25	43	25	0	0	0	2.236068e+00	99.247166	0.000000e+00
HOLMES	MaxTime	90.408464	16128	21	16	1.248150e+03	3.895767e-05	0.000000e+00	32950	32384	32992	32384	0	0	15992	0.000000e+00	0.775199	0.000000e+00
HONG	Converged	0.000276	81	7	0	2.257092e+01	8.563155e-06	3.906548e-06	200	190	214	190	0	0	0	1.000000e+03	0.551101	4.366802e+01
HS10	Converged	0.000135	49	5	0	-1.000003e+00	1.685880e-06	5.745382e-06	169	113	179	113	0	0	0	1.000000e+01	1.000004	4.999993e-01
HS100	Converged	0.116295	9373	15	9	6.806301e+02	9.484349e-06	2.645438e-06	83466	50988	83496	50988	0	0	8853	4.837632e+01	5.704029	1.197847e+00
HS100LNP	Converged	0.005517	1328	6	1	6.806301e+02	5.818392e-06	4.371968e-07	4159	3385	4171	3385	0	0	843	3.264155e+01	5.704029	1.197847e+00
HS100MOD	Converged	0.068247	3244	9	3	6.786796e+02	9.980697e-06	9.861360e-07	29957	18186	29975	18186	0	0	2910	1.014889e+01	5.904106	1.187541e+00
HS101	NotFinite	0.007495	231	1	1	9.902837e+01	NaN	NaN	557	509	560	509	0	0	0	1.430038e+01	6.53391	2.261524e+00
HS102	NotFinite	0.001776	48	0	1	2.206894e+03	NaN	NaN	112	105	113	105	0	0	0	2.236068e+00	15.874524	0.000000e+00
HS103	NotFinite	0.006526	149	0	1	2.208891e+03	NaN	NaN	356	328	357	328	0	0	0	2.236068e+00	15.874524	0.000000e+00
HS104	NotFinite	0.003971	141	2	1	5.308719e-01	NaN	3.166358e-01	952	619	957	619	0	0	0	8.173225e+01	11.405796	4.172347e+00
HS105	Converged	0.152929	308	6	0	1.044612e+03	4.672851e-06	0.000000e+00	1292	951	1304	951	0	0	0	1.000000e+00	287.861448	0.000000e+00
HS106	MaxIter	0.807850	199002	200	199	8.537159e+03	1.000000e+00	0.000000e+00	520049	442860	520449	442860	279	0	186520	8.336944e+06	5240.353634	0.000000e+00
HS107	Converged	3.121331	193103	198	193	5.055012e+03	9.618724e-06	2.544163e-09	1284261	832465	1284657	832465	0	0	189492	8.748188e+04	2.285948	7.915116e+03
HS108	Converged	0.000793	143	6	0	-8.660258e-01	4.385211e-06	3.149711e-06	331	317	343	317	0	0	0	2.456734e+01	2.000001	9.674057e-01
HS109	MaxIter	1.591576	200000	200	200	5.431989e+03	9.773056e+11	1.342275e-05	449563	420625	449963	420625	0	0	194533	2.449490e+15	1455.277332	2.628860e+10
HS11	Converged	0.000121	39	6	0	-8.498476e+00	5.970567e-06	3.759154e-06	98	96	110	96	0	0	0	1.000000e+01	1.961954	3.049325e+00
HS110	Converged	0.000102	4	4	0	-4.577848e+01	1.031245e-06	0.000000e+00	21	20	29	20	0	0	0	0.000000e+00	29.568137	0.000000e+00
HS111	Converged	0.023603	1081	6	0	-4.776110e+01	4.483741e-06	1.217640e-06	2267	2186	2279	2186	0	0	0	1.447045e+02	12.48268	2.226323e+01
HS111LNP	Converged	0.023406	1081	6	0	-4.776110e+01	4.483741e-06	1.217640e-06	2267	2186	2279	2186	0	0	0	1.447045e+02	12.48268	2.226323e+01
HS112	NotFinite	0.000502	20	1	1	-5.294153e+02	NaN	NaN	47	46	50	46	0	0	0	1.560565e+01	9.117253	2.199622e+01
HS113	MaxIter	3.143446	195267	200	195	2.430621e+01	1.244620e-04	4.502346e-07	2149165	1266874	2149565	1266874	0	0	193869	3.840977e+01	18.797608	2.290201e+00
HS114	MaxIter	1.833105	195963	200	195	-1.768807e+03	2.982926e-04	5.181719e-07	1447350	915834	1447750	915834	0	0	188863	9.844765e+03	16313.822428	4.051640e+02
HS116	MaxIter	2.270030	196851	200	196	1.546721e+02	1.418074e-01	2.027485e-06	1340973	862717	1341373	862717	0	0	120909	1.290209e+09	861.064546	2.903796e+03
HS117	MaxIter	3.669855	198216	200	196	3.234868e+01	2.668763e-04	5.982322e-08	1881094	1135909	1881494	1135909	0	0	191130	2.809571e+02	13.300647	7.712535e-01
HS118	Converged	0.001700	295	6	0	6.648205e+02	3.551765e-06	3.700100e-06	691	638	703	638	0	0	0	6.655833e+01	144.734246	5.373634e+00
HS119	Converged	0.398049	4275	10	4	2.448997e+02	9.580795e-06	9.594952e-07	33684	21017	33704	21017	0	0	3317	5.255800e+03	3.173506	1.219039e+02
HS12	Converged	0.000127	36	6	0	-3.000000e+01	9.134912e-06	7.284788e-09	103	90	115	90	0	0	0	1.000000e+02	3.605551	4.999994e-01
HS13	Converged	0.000143	59	9	0	9.587107e-01	3.640586e-07	9.079939e-06	139	145	157	145	0	0	0	1.000000e+08	1.020862	1.499791e+03
HS14	Converged	0.000178	39	6	0	1.393454e+00	4.445662e-07	4.035188e-06	99	97	111	97	0	0	0	1.301960e+02	1.227947	2.439719e+00
HS15	Converged	0.000424	64	9	0	3.064995e+02	4.547474e-13	7.604421e-07	591	376	609	376	0	0	0	1.000000e+04	2.061551	6.999994e+02
HS16	Converged	0.000122	30	6	0	2.500000e-01	8.138462e-06	0.000000e+00	100	87	112	87	0	0	0	1.414214e+00	0.559017	0.000000e+00
HS17	Converged	0.000128	37	6	0	1.000000e+00	1.278357e-07	2.055425e-06	103	98	115	98	0	0	0	1.000050e+02	0.000002	2.000000e+00
HS18	Converged	0.000147	52	6	0	5.000000e+00	6.883372e-06	1.115618e-07	136	122	148	122	0	0	0	1.000050e+02	15.890246	1.999999e-01
HS19	Converged	0.041974	15035	21	15	-6.961816e+03	2.100882e-06	1.048767e-06	54006	41845	54048	41845	0	0	14866	1.328569e+04	14.120183	1.647860e+03
HS2	Converged	0.000065	15	6	0	4.941229e+00	1.173978e-06	0.000000e+00	76	65	88	65	0	0	0	0.000000e+00	1.934142	0.000000e+00
HS20	Converged	0.000183	44	6	0	3.819828e+01	6.005976e-09	6.267921e-06	157	132	169	132	0	0	0	1.000001e+03	0.999997	7.113237e+01

name	status	time	inner iterations	outer iterations	inner convergence failures	f	ε	δ	f evaluations	grad_f evaluations	g evaluations	grad_g evaluations	linesearch failures	L-BFGS failures	L-BFGS rejected	‖Σ‖	‖x‖	‖y‖
HS21	Converged	0.000080	3	3	0	-9.996000e+01	3.822339e-06	0.000000e+00	27	15	33	15	0	0	0	1.000000e+00	2.0	0.000000e+00
HS21MOD	Converged	0.000057	3	4	0	-9.596000e+01	4.299860e-06	0.000000e+00	17	18	25	18	0	0	0	1.000000e+00	2.828427	0.000000e+00
HS22	Converged	0.000146	42	7	0	9.999944e-01	3.461321e-07	8.916337e-06	110	105	124	105	0	0	0	1.173921e+01	1.41422	9.428017e-01
HS23	Converged	0.000185	50	6	0	1.999991e+00	7.135390e-08	3.791725e-06	153	122	165	122	0	0	0	5.889584e+02	1.41421	2.828433e+00
HS24	Converged	0.000146	43	7	0	-1.000002e+00	6.672492e-06	1.717441e-06	158	122	172	122	0	0	0	2.002961e+01	3.464102	1.000002e+00
HS25	Converged	0.028463	88	6	0	1.368410e-11	1.891724e-06	0.000000e+00	846	483	858	483	0	0	0	0.000000e+00	55.921382	0.000000e+00
HS25NE	Converged	0.008535	105	5	0	0.000000e+00	6.012810e-06	5.876295e-06	296	229	306	229	0	0	0	1.545079e+03	55.919101	4.286998e-01
HS26	Converged	0.000229	89	6	0	9.697081e-13	6.092685e-06	6.648329e-08	196	196	208	196	0	0	0	1.000000e+01	1.732337	4.913824e-07
HS268	MaxIter	0.775672	196076	200	196	6.490394e-06	1.262714e-03	0.000000e+00	400281	392774	400681	392774	0	0	195991	2.236068e+00	5.552289	0.000000e+00
HS27	Converged	0.000155	64	6	0	4.000002e-02	1.694306e-06	3.985607e-07	156	148	168	148	0	0	0	1.000000e+01	1.414214	4.000225e-02
HS28	Converged	0.000159	58	6	0	1.633900e-11	4.444747e-06	2.569061e-09	134	134	146	134	0	0	0	1.000000e+02	0.866018	3.366202e-06
HS29	Converged	0.000225	78	6	0	-2.262742e+01	2.180323e-06	7.423696e-08	193	175	205	175	0	0	0	1.000000e+01	5.291503	7.071067e-01
HS2NE	MaxIter	0.335643	192031	200	192	0.000000e+00	3.175000e+01	2.215671e+00	464103	424300	464503	424300	0	0	191937	1.081367e+15	1.930766	2.217545e+15
HS3	Converged	0.000041	0	5	0	1.422652e-08	3.842024e-06	0.000000e+00	10	15	20	15	0	0	0	0.000000e+00	0.037718	0.000000e+00
HS30	Converged	0.000045	2	1	0	1.000000e+00	0.000000e+00	0.000000e+00	7	7	9	7	0	0	0	1.000000e+00	1	0.000000e+00
HS31	Converged	0.000122	41	6	0	5.999998e+00	5.864978e-07	2.893543e-07	104	100	116	100	0	0	0	1.000000e+02	1.825742	6.000000e+00
HS32	Converged	0.000190	56	6	0	9.999997e-01	3.306998e-06	1.281726e-07	143	136	155	136	0	0	0	1.002348e+02	0.999999	2.000003e+00
HS33	Converged	0.000093	7	4	0	-4.000000e+00	1.801875e-07	1.678828e-06	64	26	72	26	0	0	0	1.004988e+01	2.0	2.500000e-01
HS34	Converged	0.000281	73	6	0	-8.340317e-01	3.890617e-06	1.733117e-06	355	214	367	214	0	0	0	2.995014e+01	10.295509	4.364609e-01
HS35	Converged	0.000130	40	6	0	1.111113e-01	8.236936e-06	6.383526e-07	98	98	110	98	0	0	0	1.000000e+01	1.606317	2.222188e-01
HS35I	Converged	0.000133	40	6	0	1.111113e-01	8.236936e-06	6.383526e-07	98	98	110	98	0	0	0	1.000000e+01	1.606317	2.222188e-01
HS35MOD	Converged	0.000099	23	6	0	2.500000e-01	3.325722e-06	0.000000e+00	76	69	88	69	0	0	0	1.000000e+01	1.658313	0.000000e+00
HS36	Converged	0.000097	21	6	0	-3.300000e+03	2.842171e-14	2.051632e-07	71	68	83	68	0	0	0	1.000000e+01	27.313001	1.100000e+02
HS37	Converged	0.000175	44	7	0	-3.456000e+03	4.303804e-06	2.028826e-06	131	118	145	118	0	0	0	1.000050e+02	29.393876	1.440000e+02
HS38	Converged	0.000126	50	6	0	2.139105e-14	9.932783e-06	0.000000e+00	122	119	134	119	0	0	0	0.000000e+00	2.0	0.000000e+00
HS39	Converged	0.000284	103	7	0	-1.000003e+00	5.461454e-06	2.984141e-06	233	227	247	227	0	0	0	6.887232e+02	1.414223	1.414195e+00
HS3MOD	Converged	0.000047	8	6	0	1.018997e-15	1.388357e-06	0.000000e+00	34	34	46	34	0	0	0	0.000000e+00	0.0	0.000000e+00
HS4	Converged	0.000037	1	1	0	2.666667e+00	0.000000e+00	0.000000e+00	4	5	6	5	0	0	0	0.000000e+00	1	0.000000e+00
HS40	Converged	0.000206	72	5	0	-2.499973e-01	7.223329e-06	6.114298e-06	159	159	169	159	0	0	0	1.062775e+02	1.455224	7.731244e-01
HS41	Converged	0.000123	31	6	0	1.925926e+00	1.076161e-06	4.195258e-07	120	82	132	82	0	0	0	1.000000e+01	2.160247	1.111112e-01
HS42	Converged	0.000179	60	6	0	1.385785e+01	2.779374e-06	3.490750e-06	139	138	151	138	0	0	0	4.082544e+01	3.162277	3.229382e+00
HS43	Converged	0.000294	99	6	0	-4.400000e+01	4.577813e-06	3.728469e-06	221	216	233	216	0	0	0	1.091058e+02	2.449489	2.236060e+00
HS44	Converged	0.000205	38	6	0	-1.500000e+01	1.576583e-07	7.949384e-07	191	105	203	105	0	0	0	1.338458e+01	5.0	1.952562e+00
HS44NEW	Converged	0.000287	37	6	0	-1.500000e+01	1.484422e-07	8.059304e-07	155	95	167	95	0	0	0	1.338821e+01	5.0	1.952562e+00
HS45	Converged	0.000044	5	3	0	1.000000e+00	0.000000e+00	0.000000e+00	30	26	36	26	0	0	0	0.000000e+00	7.416198	0.000000e+00
HS46	Converged	0.000607	167	6	0	7.643831e-12	9.108839e-06	2.366683e-06	353	352	365	352	0	0	0	8.902253e+01	2.239157	7.517522e-07
HS47	Converged	0.000237	70	5	0	-5.684613e-12	7.149364e-06	9.727883e-07	158	155	168	155	0	0	0	1.154807e+02	2.236223	2.927082e-06
HS48	Converged	0.000170	61	6	0	1.756375e-11	8.104264e-06	6.016194e-09	138	140	150	140	0	0	0	1.106752e+02	2.236068	2.032578e-06
HS49	Converged	0.000371	142	6	0	1.210645e-11	7.610881e-06	3.739024e-07	302	302	314	302	0	0	0	1.001199e+02	2.237666	3.777965e-07
HS5	Converged	0.000083	8	6	0	-1.913223e+00	5.206002e-06	0.000000e+00	86	34	98	34	0	0	0	0.000000e+00	1.641112	0.000000e+00
HS50	Converged	0.000274	99	6	0	1.885662e-13	5.316818e-06	3.863162e-07	215	216	227	216	0	0	0	1.934559e+01	2.236068	8.736478e-07
HS51	Converged	0.000274	100	6	0	3.132219e-10	3.058085e-06	8.601100e-06	223	218	235	218	0	0	0	2.421755e+02	2.236052	5.877899e-05
HS52	Converged	0.000406	139	7	0	5.326616e+00	9.556198e-06	2.373197e-06	313	299	327	299	0	0	0	1.137760e+02	0.694181	8.900292e+00
HS53	Converged	0.000257	92	7	0	4.093014e+00	8.993996e-06	9.596286e-07	213	205	227	205	0	0	0	9.803330e+01	1.061903	6.679555e+00
HS54	Converged	0.223081	65128	71	65	-8.674088e-01	3.805281e-06	2.661665e-06	258493	193291	258635	193291	0	0	64846	1.000000e+01	50159746.522845	4.646783e-05
HS55	Converged	0.000833	160	6	0	6.666667e+00	7.835490e-06	1.667988e-06	630	482	642	482	0	0	0	3.482720e+01	2.603418	1.011272e+00
HS56	Converged	0.000366	86	6	0	-3.456000e+00	1.336407e-06	2.991656e-07	202	193	214	193	0	0	0	4.023513e+01	3.532427	1.440000e+00
HS57	Converged	0.000275	4	6	0	3.064631e-02	4.385285e-06	0.000000e+00	44	26	56	26	0	0	0	1.000000e+00	5.017769	0.000000e+00
HS59	Converged	0.000424	15	6	0	-6.749505e+00	7.049178e-06	0.000000e+00	48	48	60	48	0	0	0	1.732051e+00	69.852233	0.000000e+00
HS6	Converged	0.000273	83	6	0	9.456495e-12	2.455589e-06	1.556293e-08	437	307	449	307	0	0	0	1.000000e+01	1.41422	2.459591e-07
HS60	Converged	0.000200	67	6	0	3.256820e-02	7.423775e-07	1.494867e-07	153	153	165	153	0	0	0	1.000000e+01	2.238252	1.072671e-02
HS61	Converged	0.000149	48	6	0	-1.436461e+02	2.807059e-06	5.306349e-08	130	116	142	116	0	0	0	5.431942e+01	6.570519	1.951372e+00
HS62	Converged	0.084474	4069	10	4	-2.627252e+04	5.839473e-06	2.477390e-07	78204	43110	78224	43110	0	0	3896	1.000000e+05	0.701658	6.386936e+03
HS63	Converged	0.000190	52	6	0	9.617152e+02	3.631826e-06	1.873597e-08	126	124	138	124	0	0	0	4.040721e+01	5.0	1.253975e+00
HS64	Converged	0.000512	127	9	0	6.299836e+03	3.349216e-06	2.614939e-06	281	281	299	281	0	0	0	1.000000e+05	246.61295	2.279024e+03
HS65	Converged	0.000253	85	6	0	9.535289e-01	4.045847e-07	2.163564e-08	246	205	258	205	0	0	0	1.000000e+02	6.928203	8.215330e-02
HS66	Converged	0.000237	71	6	0	5.181630e-01	2.560022e-06	3.421652e-07	233	160	245	160	0	0	0	1.240897e+02	3.542625	6.948689e-01
HS67	NotFinite	0.000225	0	0	1	-8.687259e+02	NaN	NaN	2	3	3	3	0	0	0	3.741657e+00	12126.723346	0.000000e+00
HS68	Converged	0.000849	190	9	0	-9.203894e-01	3.411285e-06	2.615292e-06	507	419	525	419	0	0	0	1.000016e+05	3.75483	1.365604e+01
HS69	Converged	0.007600	2190	8	2	-9.567130e+02	9.010107e-06	2.241775e-06	4718	4470	4734	4470	0	0	1933	1.035024e+04	1.448806	5.526730e+01
HS7	Converged	0.000129	34	6	0	-1.732051e+00	1.634483e-06	8.113111e-09	82	87	94	87	0	0	0	1.000000e+01	1.732051	2.886751e-01
HS70	Converged	0.005352	71	6	0	7.498464e-03	5.545809e-06	0.000000e+00	185	162	197	162	0	0	0	1.000000e+00	13.2814	0.000000e+00
HS71	Converged	0.000382	123	6	0	1.701402e+01	1.967858e-06	7.803392e-08	373	318	385	318	0	0	0	1.701907e+02	6.324555	5.754132e-01
HS72	Converged	0.000481	232	13	0	7.275865e+02	2.914437e-06	2.708889e-06	496	504	522	504	0	0	0	1.071311e+08	363.739385	4.213214e+04
HS73	Converged	0.000741	202	6	0	2.989438e+01	5.489006e-06	7.832746e-08	910	648	922	648	0	0	0	4.259612e+02	0.710177	1.838499e+01
HS74	MaxIter	1.546850	195140	200	195	5.126498e+03	3.700535e-02	8.670895e-10	1115528	750820	1115928	750820	0	0	192975	1.442847e+05	1230.911037	8.129248e+00
HS75	MaxIter	1.636809	194335	200	194	5.174413e+03	1.502072e-01	3.187506e-08	1184527	784105	1184927	784105	0	0	189205	7.582984e+07	1207.646097	3.111136e+03

name	status	time	inner iterations	outer iterations	inner convergence failures	f	ε	δ	f evaluations	grad_f evaluations	g evaluations	grad_g evaluations	linesearch failures	L-BFGS failures	L-BFGS rejected	‖Σ‖	‖x‖	‖y‖
HS76	Converged	0.000312	36	6	0	-4.681818e+00	4.136636e-06	5.771799e-07	85	90	97	90	0	0	0	1.009950e+01	2.178027	4.545455e-01
HS76I	Converged	0.000139	36	6	0	-4.681818e+00	4.136636e-06	5.771799e-07	85	90	97	90	0	0	0	1.009950e+01	2.178027	4.545455e-01
HS77	Converged	0.000578	165	6	0	2.415051e-01	6.602498e-06	2.550922e-08	355	351	367	351	0	0	0	1.256377e+02	2.702557	9.128831e-02
HS78	Converged	0.000193	62	6	0	-2.919700e+00	8.235738e-06	3.320562e-07	142	142	154	142	0	0	0	7.278861e+01	3.162278	1.028877e+00
HS79	Converged	0.000343	110	6	0	7.877683e-02	7.405551e-06	7.132622e-07	238	238	250	238	0	0	0	5.883418e+01	3.307147	4.227471e-02
HS8	Converged	0.000108	32	5	0	-1.000000e+00	6.003751e-06	2.117408e-07	80	79	90	79	0	0	0	1.212960e+02	5.0	1.264633e-06
HS80	Converged	0.000240	64	6	0	5.394985e-02	1.974076e-06	8.124353e-08	144	146	156	146	0	0	0	1.031906e+02	3.162278	5.550793e-02
HS81	Converged	0.000331	79	7	0	5.394985e-02	2.203498e-06	2.391652e-06	181	179	195	179	0	0	0	1.124156e+01	3.162278	5.550771e-02
HS83	Converged	0.002439	1113	14	1	-3.066554e+04	4.927684e-06	2.407652e-06	2444	2314	2472	2314	0	0	988	6.518829e+03	107.005498	9.043195e+02
HS84	MaxIter	0.397122	199151	200	199	-5.280335e+06	2.472783e-02	0.000000e+00	419598	409005	419998	409005	0	0	198921	1.000000e+04	61.333827	1.913665e+01
HS85	Converged	1.851901	650	7	0	-2.215605e+00	6.849310e-06	1.792847e-06	15679	5457	15693	5457	0	0	0	2.723939e+01	769.699355	6.059620e-02
HS86	Converged	0.000914	162	8	0	-3.234869e+01	4.505726e-06	4.920009e-06	358	348	374	348	0	0	0	3.341831e+02	0.771239	1.327879e+01
HS87	MaxIter	1.545571	198204	200	198	8.996881e+03	7.212416e-01	1.886108e-07	1124876	758344	1125276	758344	0	0	189656	1.144014e+07	606.527823	4.193675e+01
HS88	Converged	0.054917	95	11	0	1.361549e+00	2.782170e-06	1.049832e-06	321	260	343	260	0	0	0	1.000000e+08	1.166854	1.050808e+03
HS89	Converged	0.051480	98	11	0	1.361596e+00	3.756483e-07	1.004692e-06	274	244	296	244	0	0	0	1.000000e+08	1.166875	1.051191e+03
HS9	Converged	0.000162	29	6	0	-5.000000e-01	5.407524e-07	4.384106e-08	132	76	144	76	0	0	0	1.000000e+02	4.999986	3.272496e-02
HS90	Converged	0.080787	103	11	0	1.361549e+00	2.862072e-07	1.049832e-06	289	245	311	245	0	0	0	1.000000e+08	1.166854	1.050810e+03
HS91	Converged	0.116022	97	11	0	1.361549e+00	7.229570e-07	1.049845e-06	288	233	310	233	0	0	0	1.000000e+08	1.166854	1.050809e+03
HS92	Converged	1.847902	1119	12	1	1.362573e+00	7.202615e-06	7.895208e-08	2401	2310	2425	2310	0	0	954	1.000000e+08	1.167293	1.059086e+03
HS93	MaxIter	0.000900	25	200	0	0.000000e+00	0.000000e+00	2.070000e+00	499	673	899	673	0	0	0	1.000000e+15	13.752958	2.070001e+15
HS95	Converged	0.000265	33	3	0	1.561953e-02	5.748291e-12	0.000000e+00	160	118	166	118	0	0	0	1.014889e+01	0.003323	3.142762e-03
HS96	Converged	0.000199	33	3	0	1.561953e-02	5.748291e-12	0.000000e+00	160	118	166	118	0	0	0	1.014889e+01	0.003323	3.142762e-03
HS97	Converged	0.001214	154	3	0	3.135809e+00	2.218670e-12	1.006586e-06	1357	810	1363	810	0	0	1	1.014889e+01	0.270353	2.514620e-01
HS98	Converged	0.001157	154	3	0	3.135809e+00	2.218670e-12	1.006586e-06	1356	810	1362	810	0	0	1	1.014889e+01	0.270353	2.514620e-01
HS99	MaxIter	3.410919	200000	200	200	-8.310799e+08	3.063857e+04	6.979390e-07	1218038	807781	1218438	807781	1	0	198211	1.234294e+07	1.248528	1.933973e+04
HS99EXP	MaxIter	2.257094	200000	200	200	-1.227958e+11	4.909955e+18	1.347649e+05	567131	481764	567531	481764	1	0	2367	3.791542e+15	277746516.552599	1.497954e+20
HUBFIT	Converged	0.000133	27	7	0	1.689326e-02	5.561817e-06	1.922904e-06	74	75	88	75	0	0	0	1.000000e+01	0.677971	1.214947e-01
HUES-MOD	Converged	3.829070	1277	15	1	3.482449e+07	3.809546e-06	1.146669e-06	5889	4122	5919	4122	1	0	922	4.689518e+05	417279.822343	1.282528e+05
HUESTIS	Converged	35.469192	7052	17	7	1.741224e+11	9.140215e-06	7.474518e-06	198677	106145	198711	106145	886	0	6358	3.150933e+07	417279.813257	6.412639e+08
HVYCRASH	MaxTime	90.327206	87016	88	87	3.741653e-02	1.321758e+00	1.029545e-01	176746	174557	176922	174557	0	0	0	6.763699e+06	24770.300537	6.588661e+05
HYDCAR20	MaxIter	21.088233	199337	200	199	0.000000e+00	1.053500e+13	6.338395e-02	401475	399274	401875	399274	0	0	0	9.047198e+15	1392.779741	1.093275e+14
HYDCAR6	MaxIter	5.928057	199031	200	198	0.000000e+00	3.928754e+11	1.342372e-02	400700	398662	401100	398662	0	0	0	4.995615e+15	723.412235	2.408128e+13
HYDROELL	Converged	22.894662	20933	34	16	-3.585547e+06	9.735937e-06	3.008683e-06	217462	129352	217530	129352	0	0	10799	4.636962e+05	19859545.151604	7.146014e+02
HYDROELM	Converged	0.747382	4551	24	1	-3.582015e+06	9.177054e-06	5.564563e-06	9613	9292	9661	9292	0	0	0	1.216559e+05	14210901.355995	1.003623e+03
HYDROELS	Converged	0.087610	1574	22	0	-3.582268e+06	7.231967e-06	8.345317e-06	3450	3265	3494	3265	0	0	0	1.883037e+05	8220101.256648	1.734133e+03
HYPCIR	Converged	0.000090	26	6	0	0.000000e+00	1.161881e-06	2.319214e-07	72	70	84	70	0	0	0	1.041242e+02	2.0	2.084000e-07
INTEGREQ	Converged	0.861824	44	7	0	0.000000e+00	9.446499e-06	1.509755e-06	104	109	118	109	0	0	0	7.102641e+02	2.792691	8.265516e-06
INTEQNE	Converged	0.000222	27	6	0	0.000000e+00	8.894359e-06	2.135668e-06	68	72	80	72	0	0	0	1.248186e+02	0.412338	8.710024e-06
JANNSON3	MaxTime	93.746064	3025	5	3	1.999852e+04	8.337876e-03	1.474727e-05	24862	15390	24872	15390	127	0	2775	1.417745e+01	0.472675	2.000077e+00
JANNSON4	Converged	29.830305	2037	8	2	9.801970e+03	7.083443e-07	7.255597e-06	42254	23086	42270	23086	0	0	1925	1.000000e+03	1.000004	9.901422e+01
JENSMPNE	MaxIter	1.025091	196033	200	196	0.000000e+00	1.459200e+04	4.717376e+00	474821	432563	475221	432563	0	0	195840	3.000000e+15	0.36553	1.114406e+16
JJTABEL3	MaxIter	77.358085	200000	200	200	7.142245e+07	9.157359e+01	3.210946e-06	451804	425788	452204	425788	0	0	0	1.142879e+09	12714629.725216	7.690654e+02
JUDGENE	MaxIter	1.988432	192109	200	192	0.000000e+00	5.614264e+07	2.075376e+00	1245021	811490	1245421	811490	1	0	190213	4.242641e+15	1.512122	4.007890e+15
JUNKTURN	MaxTime	91.486090	15129	17	15	1.020152e-03	9.429718e-04	1.040474e-04	30434	30309	30468	30309	0	0	0	9.910358e+03	31.987904	1.698332e-01
KIRBY2	MaxIter	21.802254	200000	200	200	0.000000e+00	1.338707e+15	5.564623e-01	1778023	1084414	1778423	1084414	0	0	190945	1.081958e+16	1.653036	1.966097e+15
KISSING	MaxIter	1.611922	5247	200	4	4.472134e-01	4.325744e-06	1.000000e+00	13382	12263	13782	12263	0	0	2783	5.477226e+15	3.49285	5.477231e+15
KISSING2	Converged	1.349916	4827	12	2	6.216079e+00	9.842161e-06	3.014978e-07	13041	11298	13065	11298	0	0	0	1.411351e+03	10.306119	2.908672e+00
KIWCRESC	Converged	0.000185	67	6	0	-9.354761e-08	3.269069e-06	1.038183e-07	172	154	184	154	0	0	0	8.503067e+01	0.000003	7.905702e-01
KOWOSBNE	MaxIter	1.339044	193151	200	193	0.000000e+00	7.452588e+05	1.118396e-02	1077818	728825	1078218	728825	0	0	190328	2.828428e+15	0.333246	1.753241e+13
KSIP	Converged	0.367391	1183	12	0	5.757958e-01	9.043936e-06	5.731608e-06	2514	2433	2538	2433	0	0	0	7.113705e+04	0.599615	4.585606e-01
KTMODEL	NotFinite	0.272578	1000	1	2	0.000000e+00	inf	NaN	2036	2020	2039	2020	0	0	0	2.121320e+01	148455944757.997864	1.244841e+10
LAKES	NotFinite	0.001844	2	0	1	7.345891e+11	NaN	NaN	9	7	10	7	0	0	0	8.831761e+00	9.486842	8.831761e+00
LANCZOS1	MaxIter	3.899305	194386	200	194	0.000000e+00	3.450135e+08	3.081129e-04	634509	506351	634909	506351	0	0	188494	4.898979e+15	8.103914	9.591571e+11
LANCZOS2	MaxIter	3.614069	193543	200	193	0.000000e+00	4.103653e+08	3.149158e-04	596422	486832	596822	486832	0	0	188381	4.795833e+15	8.086276	9.580024e+11
LANCZOS3	NotFinite	0.020565	1139	6	1	0.000000e+00	NaN	1.361803e-03	3114	2673	3127	2673	0	0	0	4.296503e+02	7.024442	3.733069e-01
LAUNCH	NotFinite	4.325813	134817	135	135	1.064046e+01	NaN	1.523346e-06	289378	278813	289649	278813	0	0	1122	4.204257e+07	4487.888072	4.909493e+00
LCH	NotFinite	13.604622	6030	6	7	1.116944e+43	inf	6.108166e+19	25790	17233	25803	17233	1	0	1562	1.000000e+03	21279893845870408499 2.0	1.000000e+09
LEAKNET	MaxIter	12.954246	198000	200	198	8.132593e+00	1.695064e+04	3.271314e-06	398719	397485	399119	397485	0	0	0	1.783166e+13	2851.377938	5.282211e+07
LEUVEN7	MaxTime	90.487553	44598	46	44	6.946938e+02	2.064669e+00	1.136925e-06	110128	99657	110220	99657	0	0	0	4.044180e+06	19.552778	5.948600e+01
LEWISPOL	MaxIter	2.282119	186384	200	186	3.000019e+00	3.511415e-04	7.746612e-10	2067918	1202374	2068318	1202374	18511	0	163842	1.091747e+10	1.732056	8.384862e+04
LIARWHDNE	Converged	0.186860	71	6	0	0.000000e+00	7.933463e-06	1.117956e-08	193	160	205	160	0	0	0	1.517819e+03	70.710678	9.901628e-03
LIN	NotFinite	0.000064	0	0	1	-4.650863e-11	inf	NaN	1	2	2	2	0	0	0	1.414214e+00	0.707107	0.000000e+00
LINCONT	MaxTime	90.050296	190000	190	190	0.000000e+00	2.438947e+16	1.422263e+01	381252	380570	381632	380570	0	0	0	1.363207e+16	15.91999	6.487582e+16
LINSPANH	Converged	0.015166	1297	7	1	-7.700000e+01	8.043444e-06	2.491641e-06	3572	3086	3586	3086	0	0	0	1.001930e+03	4892.387691	1.000196e+00
LISWET12	MaxTime	90.292027	109512	115	109	5.534705e+00	1.128207e+02	1.600844e-03	356989	286770	357219	286770	0	0	5327	5.447596e+08	31.426293	2.952123e+05
LISWET9	MaxTime	90.445531	84324	89	84	1.116301e+01	2.502235e+02	1.077311e-02	404490	285434	404668	285434	0	0	6158	5.248507e+08	30.982213	6.605395e+05
LOADBAL	Converged	0.046724	1914	7	1	4.528512e-01	9.798043e-06	7.307503e-06	5055	4437	5069	4437	0	0	0	1.873967e+02	196.463409	1.711482e-02

name	status	time	inner iterations	outer iterations	inner convergence failures	f	ε	δ	f evaluations	grad_f evaluations	g evaluations	grad_g evaluations	linesearch failures	L-BFGS failures	L-BFGS rejected	‖Σ‖	‖x‖	‖y‖
LOOTSMA	MaxIter	0.348265	191021	200	191	0.000000e+00	6.000000e+00	2.000000e+00	427909	405345	428309	405345	0	0	190787	1.414214e+15	1.414214	2.828429e+15
LOTSCHD	Converged	0.049681	1184	9	1	2.398416e+03	9.150757e-06	7.452854e-07	46953	24659	46971	24659	0	0	965	9.867339e+01	51.491243	5.378273e+01
LSC1	MaxIter	0.462477	195075	200	195	0.000000e+00	1.251949e+07	1.957719e+00	492989	439642	493389	439642	0	0	194583	2.449490e+15	27.349954	2.777024e+15
LSC2	MaxIter	0.533573	197086	200	197	0.000000e+00	2.290539e+10	1.943615e+00	577807	479884	578207	479884	0	0	193352	2.449490e+15	715324.240769	3.661902e+15
LSNNODOC	Converged	0.000334	99	7	0	1.231124e+02	5.483508e-06	4.332424e-07	242	228	256	228	0	0	0	1.238851e+02	11.661903	2.039880e+01
LSQFIT	Converged	0.000141	32	7	0	3.378614e-02	9.926212e-06	3.475397e-06	85	85	99	85	0	0	0	1.000000e+01	0.677972	2.429847e-01
LUKVLE18	MaxTime	97.339566	3232	8	3	9.798162e+03	7.224142e-04	4.510203e-03	61299	33765	61315	33765	336	0	561	7.560194e+04	52.461102	5.090206e+02
LUKVLI1	MaxTime	101.922883	7020	8	7	9.005036e+03	9.053954e+00	2.755731e-02	14285	14152	14301	14152	0	0	0	1.385805e+02	30.017207	1.076894e-01
LUKVLI10	MaxTime	156.572341	5145	9	5	3.535103e+03	5.664568e-05	3.129503e-06	75753	42906	75771	42906	0	0	905	6.902212e+02	70.703971	4.078369e+01
LUKVLI11	Converged	7.558821	651	6	0	4.169355e-09	8.529076e-06	9.647213e-06	1470	1385	1482	1385	0	0	0	8.729906e+01	99.981995	2.194563e-05
LUKVLI12	Converged	9.059220	1012	6	0	1.696576e-06	9.056671e-06	0.000000e+00	2133	2062	2145	2062	0	0	0	1.086413e+03	47.252669	0.000000e+00
LUKVLI13	MaxTime	109.161063	3224	7	2	1.321855e+02	4.681197e-05	6.595174e-07	59479	32922	59493	32922	0	0	1909	3.478595e+02	75.039576	3.225866e+00
LUKVLI14	MaxTime	115.018373	4038	6	3	1.547338e+04	1.491839e-03	6.294390e-02	53116	30497	53128	30497	0	0	285	1.003326e+03	100.778238	2.662464e+03
LUKVLI15	MaxTime	95.471622	12584	13	11	5.750418e+00	1.097763e-02	2.449614e-04	25283	25213	25309	25213	0	0	0	5.402614e+02	571.719855	8.248500e-01
LUKVLI16	Converged	8.545775	1655	7	0	1.155456e-07	9.825546e-06	9.948563e-06	3442	3368	3456	3368	0	0	0	3.413568e+03	99.985247	9.137224e-04
LUKVLI17	MaxTime	92.711289	7078	10	6	7.805084e+02	1.073075e-04	3.586320e-07	37007	25503	37027	25503	0	0	2151	2.075181e+04	182.079312	6.732266e+01
LUKVLI18	Converged	5.314087	1124	8	0	2.259756e-07	9.995131e-06	1.805262e-06	2339	2284	2355	2284	0	0	0	2.573319e+03	99.985167	1.881846e-05
LUKVLI2	MaxTime	97.577788	1000	1	1	-4.500000e+62	2.572410e+23	4.170052e+13	16301	8715	16303	8715	0	0	248	7.070361e+01	1e+20	7.574308e+13
LUKVLI3	Converged	1.846243	210	6	0	1.157754e+01	5.193418e-06	2.458456e-07	440	439	452	439	0	0	0	1.004988e+01	1.155792	2.911353e+00
LUKVLI4	MaxTime	91.173621	9000	9	9	-1.633124e+16	2.667094e+32	6.781731e-01	19212	18054	19230	18054	0	0	8906	1.000000e+08	38.289243	7.535257e+07
LUKVLI5	Converged	23.454761	973	6	0	5.267624e-01	9.225035e-06	3.762238e-06	2085	2005	2097	2005	0	0	0	1.084573e+02	99.991661	1.691577e-01
LUKVLI6	MaxTime	97.388151	3313	6	3	6.261378e+05	5.367853e-03	2.817521e-03	12002	9253	12014	9253	0	0	1841	6.681172e+04	73.297818	1.257284e+04
LUKVLI7	MaxTime	145.140090	1256	2	1	-4.136664e+03	1.507164e-01	4.452433e+00	47903	25163	47907	25163	562	0	563	1.014889e+01	1.942436	4.984645e+01
LUKVLI8	MaxTime	193.952909	3752	6	3	8.963018e+05	2.795079e-03	1.268923e+00	51632	29487	51644	29487	0	0	610	5.377783e+04	102.750634	1.029528e+04
LUKVLI9	MaxTime	90.417571	31033	36	31	9.989331e+02	8.658196e-05	2.472521e-07	75306	68076	75378	68076	5	0	30914	1.024695e+01	10.591633	1.234013e-04
MADSEN	Converged	0.000221	50	6	0	6.164325e-01	9.913480e-07	1.878122e-07	129	123	141	123	0	0	1	1.314683e+02	1.186329	7.318054e-01
MADSSCHJ	Converged	6.021147	6020	8	6	-4.992134e+03	4.298333e-08	6.611117e-09	13249	12411	13265	12411	0	0	5354	1.421197e+02	5042.369836	7.077021e-02
MAKELA1	Converged	0.000136	38	6	0	-1.414215e+00	1.969005e-07	1.390810e-06	133	105	145	105	0	0	0	9.640681e+01	1.732052	7.653665e-01
MAKELA2	Converged	0.000248	90	6	0	7.200000e+00	6.841837e-06	3.445862e-08	216	202	228	202	0	0	0	1.042359e+02	7.683749	7.969899e-01
MAKELA3	Converged	0.002835	497	7	0	2.500696e-06	9.894734e-06	6.894871e-06	1126	1053	1140	1053	0	0	1	9.142414e+01	0.004218	2.984562e-01
MAKELA4	Converged	0.002281	284	6	0	9.998696e-08	5.453426e-06	4.291752e-06	743	655	755	655	0	0	0	7.513063e+01	0.000007	2.579010e-01
MANCINONE	Converged	0.364926	43	6	0	0.000000e+00	9.022947e-06	2.695700e-09	106	104	118	104	0	0	0	9.881040e+01	338.021504	4.911075e-09
MANNE	Converged	1.332107	327	6	0	-9.745726e-01	0.000000e+00	0.000000e+00	807	711	819	711	0	0	0	2.356573e+02	5278.802781	0.000000e+00
MARINE	MaxTime	93.655527	12000	12	12	4.310154e+09	1.696724e+09	9.443073e+03	31053	27395	31077	27395	0	0	0	1.311625e+05	242039.071638	6.148839e+07
MATRIX2	Converged	0.000173	31	6	0	9.987187e-13	5.862766e-06	9.743529e-12	144	80	156	80	0	0	0	1.004988e+01	0.000005	4.721594e-01
MCONCON	MaxIter	1.408634	200000	200	200	-6.230502e+03	6.005966e+00	1.667598e-08	651189	524540	651589	524540	0	0	68736	7.447100e+07	2762.212229	8.516513e-01
MESH	MaxIter	3.676761	197000	200	197	-4.609834e+21	4.294105e+09	7.028047e-08	559080	470898	559480	470898	0	0	0	2.007440e+15	2147052356302.460693	2.498938e+09
METHANL8	MaxIter	5.730866	199488	200	199	0.000000e+00	9.585438e+11	7.423085e-03	401829	399576	402229	399576	0	0	0	4.772586e+15	2475.612301	9.247791e+12
MEYER3NE	MaxIter	2.215150	200000	200	200	0.000000e+00	1.448564e+17	1.869280e+01	960959	676626	961359	676626	0	0	198574	3.741657e+15	6638.043499	4.826876e+16
MGH09	MaxIter	0.891427	194266	200	194	0.000000e+00	7.891185e+06	2.489817e-02	448099	414706	448499	414706	0	0	192231	3.181166e+15	252.841788	3.062566e+13
MGH09LS	Converged	0.001240	210	6	0	9.395630e-04	3.687305e-06	0.000000e+00	1287	839	1299	839	0	0	0	0.000000e+00	201.804864	0.000000e+00
MGH10	MaxIter	1.221812	200000	200	200	0.000000e+00	3.966353e+31	1.842203e+04	467121	428220	467521	428220	3	0	199389	3.741657e+15	400085.07656	3.115998e+19
MGH10LS	MaxIter	0.910675	200000	200	200	1.366856e+09	4.054066e+03	0.000000e+00	450507	420554	450907	420554	1	0	199937	0.000000e+00	400780.488493	0.000000e+00
MGH10S	MaxIter	1.374628	200000	200	200	0.000000e+00	8.555544e+20	2.895358e+02	521758	456812	522158	456812	0	0	199504	3.741657e+15	23.963918	6.645357e+17
MGH10SLS	MaxIter	0.942643	200000	200	200	4.417287e+05	2.055730e+06	0.000000e+00	422843	406945	423243	406945	0	0	199639	0.000000e+00	23.963918	0.000000e+00
MGH17	NotFinite	0.008084	42	2	1	0.000000e+00	NaN	3.118854e-01	838	459	843	459	0	0	0	2.840966e+02	176.792469	8.826694e+00
MGH17LS	Converged	0.002858	73	6	0	1.022432e+00	6.589307e-06	0.000000e+00	693	420	705	420	0	0	0	0.000000e+00	176.790388	0.000000e+00
MGH17S	MaxIter	6.590671	195291	200	195	0.000000e+00	3.798874e+07	8.794842e-02	1075874	728682	1076274	728682	0	0	192302	5.000008e+15	200.000823	1.560127e+14
MGH17SLS	Converged	0.003879	61	6	0	1.022438e+00	9.439398e-06	0.000000e+00	1530	298	1542	298	0	0	0	0.000000e+00	275.172269	0.000000e+00
MIFFLIN1	Converged	0.000110	22	6	0	-1.000000e+00	5.038782e-06	4.819665e-08	109	62	121	62	0	0	0	1.364053e+01	1.414214	7.071065e-01
MIFFLIN2	Converged	0.000238	73	6	0	-9.999998e-01	3.736046e-06	1.689423e-07	172	168	184	168	0	0	6	1.004988e+02	1.414213	9.313147e-01
MINC44	Converged	0.744445	1526	11	0	3.828686e-04	9.114358e-06	3.584022e-06	3090	3085	3112	3085	0	0	0	3.850941e+04	1.066355	1.066388e+00
MINMAXBD	Converged	0.053004	7676	10	7	1.157064e+02	9.705610e-06	5.993473e-06	18475	16657	18495	16657	0	0	6207	1.306714e+01	117.195148	6.189276e-01
MINMAXRB	Converged	0.000277	125	6	0	1.796007e-08	7.037037e-06	7.667814e-08	322	291	334	291	0	0	0	1.190677e+02	1.414214	5.271300e-01
MINPERM	Converged	0.627681	1268	11	0	3.628691e-04	3.998887e-06	2.023078e-07	2579	2569	2601	2569	0	0	0	7.235589e+04	1.011949	1.060205e+00
MINSURFO	Converged	1.534306	456	6	0	2.506949e+00	9.415131e-06	0.000000e+00	992	930	1004	930	0	0	0	0.000000e+00	55.929345	0.000000e+00
MISRA1A	MaxIter	1.306123	199005	200	199	0.000000e+00	1.163853e+13	1.309682e-01	602149	496486	602549	496486	0	0	198761	3.741657e+15	239.166712	3.530227e+14
MISRA1B	MaxIter	0.990431	199005	200	199	0.000000e+00	6.908926e+12	1.385159e-01	620791	505561	621191	505561	0	0	198731	3.741657e+15	334.730333	2.868629e+14
MISRA1C	NotFinite	0.109684	7006	8	8	0.000000e+00	NaN	8.316787e-01	75255	44446	75272	44446	0	0	6915	1.151190e+07	659.675278	3.925893e+05
MISRA1D	MaxIter	0.991823	199006	200	199	0.000000e+00	7.068928e+13	1.655690e-01	698976	544496	699376	544496	0	0	198689	2.828427e+15	428.624684	2.894053e+14
MISTAKE	Converged	0.000798	135	6	0	-1.000000e+00	7.628987e-06	2.865664e-06	342	304	354	304	0	0	0	1.006017e+02	2.495672	5.000033e-01
MODEL	MaxIter	11.605226	199292	200	199	0.000000e+00	4.474816e+07	1.600004e-01	958039	674248	958439	674248	0	0	191067	2.000000e+15	5.745328	2.000018e+14
MPC16	MaxTime	90.162825	130000	130	130	-9.922814e+06	2.415277e+09	6.398502e+01	280946	269929	281206	269929	0	0	0	5.533258e+08	11357.7885	6.616860e+09
MRIBASIS	Converged	0.022407	914	10	0	1.821790e+01	4.558399e-06	1.251023e-06	1987	1893	2007	1893	0	0	0	1.003883e+05	50.283304	1.408781e-06
MSQRTA	MaxTime	90.958897	24649	27	24	0.000000e+00	2.421903e-05	5.752680e-07	49435	49384	49489	49384	0	0	0	1.663022e+04	22.681906	6.727104e-04
MSQRTB	Converged	32.771234	11395	14	10	0.000000e+00	9.843004e-06	1.758464e-06	22878	22837	22906	22837	0	0	0	1.766564e+03	22.677864	1.955925e-04
MSS1	Converged	0.003835	112	11	0	-8.997628e+00	4.931664e-07	3.659997e-06	350	279	372	279	0	0	0	4.131345e+05	1.0	1.201456e+03

name	status	time	inner iterations	outer iterations	inner convergence failures	f	ε	δ	f evaluations	grad_f evaluations	g evaluations	grad_g evaluations	linesearch failures	L-BFGS failures	L-BFGS rejected	‖Σ‖	‖x‖	‖y‖
MSS2	Converged	5.320669	3066	12	3	-2.700000e+01	9.070552e-06	1.929988e-09	73354	39660	73378	39660	0	0	2879	1.888702e+07	1.0	6.003677e+03
MSS3	Converged	13.907381	3077	11	3	-4.483529e+01	2.247476e-06	1.850236e-06	63917	34953	63939	34953	0	0	2880	1.727796e+08	1.0	1.955003e+04
MUONSINE	MaxIter	33.040116	194021	200	194	0.000000e+00	6.904577e+04	2.964772e-04	409796	398797	410196	398797	0	0	193566	1.744228e+16	6.0	2.553604e+12
MWRIGHT	Converged	0.000386	117	6	0	1.288383e+00	5.170475e-06	6.088179e-07	254	252	266	252	0	0	0	2.331076e+02	4.046905	5.738518e-01
NASH	MaxIter	12.262359	196968	200	196	0.000000e+00	1.562619e+08	8.835551e+00	3497726	1942471	3498126	1942471	4246	1	140895	3.851689e+15	349.569004	1.908468e+16
NELSON	NotFinite	0.013034	51	0	1	0.000000e+00	inf	NaN	958	469	959	469	0	0	0	1.131371e+01	2.000027	0.000000e+00
NGONE	Converged	42.605707	33456	38	31	-6.432413e-01	9.228936e-06	8.799441e-08	70352	68397	70428	68397	0	0	0	2.590451e+04	8.2019	2.269383e+00
NINE12	MaxTime	90.189158	12415	13	11	7.867491e+03	7.754843e-04	2.269488e-05	24906	24878	24932	24878	0	0	0	1.692920e+03	4877.853461	3.386521e+00
NINE5D	MaxTime	91.429664	13545	14	13	1.005869e+04	1.134585e-01	8.641400e-04	27229	27164	27257	27164	0	0	0	6.069124e+03	5385.986878	3.683024e+00
NINENEW	MaxTime	144.946825	16468	17	16	5.907422e+03	1.467212e-05	1.160836e-06	133244	83036	133278	83036	0	0	2304	2.042458e+03	4444.258816	3.319116e+00
NUFFIELD	MaxTime	90.001940	106000	107	106	-2.902740e-02	2.459140e+01	8.333076e-06	216232	213118	216446	213118	0	0	0	8.228007e+06	0.03197	4.631978e+00
NYSTROM5	Converged	0.073994	7621	12	7	0.000000e+00	8.404506e-06	7.767731e-07	15279	15278	15303	15278	0	0	0	1.055390e+04	1.493085	1.295048e-01
ODFITS	Converged	0.001981	267	6	0	-2.380027e+03	9.589159e-06	1.922621e-06	625	552	637	552	0	0	0	1.137292e+02	1522.568155	9.620027e-01
ORTHREGB	Converged	0.002190	219	6	0	3.215014e-14	5.625408e-06	1.179657e-07	511	456	523	456	0	0	0	4.575189e+01	23.885167	1.932331e-07
ORTHREGC	MaxTime	93.172975	35931	37	35	9.481287e+01	1.713938e-03	6.940660e-06	74243	72948	74317	72948	0	0	181	5.502782e+04	79.271339	1.433625e+01
ORTHRGDM	MaxTime	92.330691	19000	19	19	1.513876e+03	7.551224e+00	1.275449e-05	39094	38492	39132	38492	0	0	0	4.022645e+04	275.192034	6.606113e-01
OSBORNE1	MaxIter	7.418083	196154	200	196	0.000000e+00	6.313886e+09	5.180616e-03	1233234	809626	1233634	809626	0	0	191432	4.690671e+15	30.542356	8.894770e+12
OSBORNE2	NotFinite	1.381038	10798	15	11	0.000000e+00	NaN	1.841387e-01	63926	42516	63957	42516	0	0	2836	9.606746e+08	1899.173381	2.871128e+07
OSORIO	Converged	50.081630	25045	29	24	2.041970e+00	9.299719e-06	2.810954e-07	61605	55847	61663	55847	0	0	0	3.028345e+03	3.133519	1.362984e-02
PENTAGON	Converged	0.000587	108	7	0	1.365218e-04	7.631423e-06	1.307378e-07	317	277	331	277	0	0	0	2.017460e+01	1.888121	1.195797e-03
PFIT1	NotFinite	0.002494	207	4	1	0.000000e+00	NaN	1.056690e-02	2080	1182	2089	1182	0	0	0	9.846318e+01	7.326926	2.525978e-01
PFIT2	Converged	0.006371	1265	7	0	0.000000e+00	9.497721e-06	7.472867e-10	4938	3627	4952	3627	0	0	0	1.163590e+03	4.123106	7.059405e-07
PFIT3	NotFinite	0.015421	265	2	1	0.000000e+00	NaN	2.097365e-01	1975	1100	1980	1100	0	0	0	1.265717e+02	28.817306	2.439082e+00
PFIT4	NotFinite	0.022846	719	2	1	0.000000e+00	NaN	3.740387e-01	7506	4269	7511	4269	0	0	0	1.293278e+02	36.916339	4.448318e+00
POLAK2	Converged	0.063532	13684	18	13	5.459814e+01	9.020404e-06	8.985275e-06	53165	39683	53201	39683	4	0	12514	1.412048e+01	54.598141	7.071067e-01
POLAK3	Converged	0.019861	455	6	0	5.933002e+00	6.567843e-06	4.167298e-06	948	929	960	929	0	0	0	1.390363e+02	5.935092	6.986921e-01
POLAK4	Converged	0.102419	1154	5	1	-4.582999e-08	4.934010e-06	5.622860e-08	81035	41120	81045	41120	986	0	0	1.005037e+02	1.0	9.151673e-01
POLAK5	Converged	0.003358	2060	7	2	5.000000e+01	2.737837e-06	8.809596e-08	4410	4158	4424	4158	0	0	1978	1.414185e+01	50.0001	7.071069e-01
POLAK6	Converged	0.071841	6193	10	6	-4.400000e+01	7.821324e-07	9.783216e-07	15182	12479	15202	12479	0	0	5955	3.716221e+01	44.068129	7.348470e-01
PORTFL1	Converged	0.032747	476	6	0	2.048628e-02	7.457889e-06	1.987769e-07	2139	1556	2151	1556	0	0	0	1.000000e+02	0.526284	9.373218e-03
PORTFL2	Converged	0.031370	467	6	0	2.968924e-02	1.803060e-06	2.479189e-07	1944	1450	1956	1450	0	0	0	1.000000e+02	0.52452	8.840603e-03
PORTFL3	Converged	0.009354	266	6	0	3.274971e-02	6.330161e-06	1.196857e-07	1122	838	1134	838	0	0	0	1.000000e+02	0.521406	1.387108e-02
PORTFL4	Converged	0.020499	450	6	0	2.630695e-02	1.393492e-06	3.447288e-07	1892	1407	1904	1407	0	0	0	1.000000e+02	0.454224	1.461552e-02
PORTFL6	Converged	0.009268	335	6	0	2.579180e-02	6.771325e-06	7.464801e-08	1350	1021	1362	1021	0	0	0	1.000000e+02	0.470446	9.599872e-03
POWELLBS	MaxIter	0.373871	192112	200	192	0.000000e+00	1.678915e+08	1.063931e-04	565437	470754	565837	470754	0	0	191713	1.000000e+15	14.566459	1.073931e+11
POWELLSQ	Converged	0.000086	14	3	0	0.000000e+00	3.231293e-06	1.056779e-07	97	43	103	43	0	0	0	1.004988e+01	0.091521	8.830107e-08
PRICE3NE	Converged	0.000110	38	6	0	0.000000e+00	1.446859e-06	2.052323e-07	100	94	112	94	0	0	0	1.079032e+01	1.414214	3.116817e-08
PRICE4NE	Converged	0.000139	41	5	0	0.000000e+00	1.794010e-06	7.888487e-06	106	97	116	97	0	0	0	1.921314e+01	4.472134	3.632187e-07
PRIMAL1	Converged	0.099307	715	6	0	-3.501299e-02	9.451642e-06	3.504368e-06	1469	1449	1481	1449	0	0	0	1.862377e+02	0.073762	1.934751e-01
PRIMAL2	Converged	0.122031	392	6	0	-3.373373e-02	8.089760e-06	2.041616e-06	821	802	833	802	0	0	0	1.816171e+02	0.076304	1.336854e-01
PRIMAL3	Converged	0.295347	435	6	0	-1.357558e-01	9.144987e-06	4.636773e-06	912	892	924	892	0	0	0	8.833969e+01	0.203609	1.303450e-01
PRIMAL4	Converged	0.161427	252	6	0	-7.460906e-01	9.796693e-06	4.844028e-06	554	529	566	529	0	0	0	7.743863e+01	0.942715	1.442579e-01
PRIMALC1	MaxIter	20.448161	196308	200	196	-6.155252e+03	7.963719e-05	2.351892e-06	1206735	795543	1207135	795543	1	0	153771	1.226922e+01	10330.497103	6.476346e-01
PRIMALC2	Converged	4.071423	22722	28	22	-3.551306e+03	6.264582e-06	1.426969e-06	251554	148317	251610	148317	0	0	21780	5.710132e+01	4726.0556	7.471513e-01
PRIMALC5	MaxIter	31.143359	195526	200	195	-4.272326e+02	3.792153e-05	1.822052e-07	1632574	1008315	1632974	1008315	2	0	172709	9.852406e+01	460.136464	5.192958e-01
PRIMALC8	MaxIter	43.668003	198276	200	198	-1.830943e+04	1.047853e-02	4.393405e-07	1352015	847109	1352415	847109	26	0	178824	1.141119e+02	33212.003326	6.352040e-01
PRODPL0	Converged	0.049668	1905	8	0	5.878979e+01	8.735056e-06	8.038602e-06	4106	3954	4122	3954	0	0	0	3.045668e+03	10.277731	3.920241e+01
PRODPL1	Converged	0.030116	3258	9	1	3.573894e+01	9.212710e-06	1.491129e-06	7150	6761	7168	6761	0	0	202	4.928956e+02	10.059562	2.352894e+01
QC	Converged	0.205725	2930	3	2	-9.565377e+02	0.000000e+00	0.000000e+00	55876	30874	55882	30874	0	0	0	2.000000e+00	0.381156	0.000000e+00
QCNEW	MaxIter	39.033707	200000	200	200	-8.048683e+02	4.998491e+03	0.000000e+00	15906878	8153839	15907278	8153839	198801	0	999	1.732051e+00	0.876604	0.000000e+00
QPCBLEND	Converged	1.261731	53081	58	49	-7.842560e-03	7.879211e-06	8.627813e-09	113841	109717	113957	109717	0	0	0	6.333513e+05	0.034164	2.186011e+01
QPCSTAIR	MaxTime	92.114546	121195	125	121	6.204392e+06	1.439042e-01	4.024219e-06	2130446	1183287	2130696	1183287	8465	0	45493	1.896326e+06	1047.09488	1.846410e+05
QPNBLEND	Converged	4.380642	82487	89	78	-9.136137e-03	7.293671e-06	6.839693e-10	519295	340554	519473	340554	2	0	34813	3.999273e+05	0.049197	2.180231e+01
RAT42	MaxIter	1.744784	197118	200	197	0.000000e+00	4.378202e+11	1.858453e+00	686709	537177	687109	537177	0	0	194656	2.730072e+15	72.461508	2.833555e+15
RAT43	NotFinite	0.008318	113	0	1	0.000000e+00	NaN	NaN	2091	1155	2092	1155	0	0	0	3.872983e+00	100.508807	0.000000e+00
READING7	MaxTime	91.019291	10000	10	10	-7.412524e+41	1.244738e+29	1.243167e+20	64862	38804	64882	38804	4	0	5979	1.000010e+09	864970105997521453056.0	1.243171e+29
RES	Converged	0.000055	0	1	0	0.000000e+00	2.784496e-14	6.123631e-15	19	3	21	3	0	0	0	3.741657e+00	65890.455166	7.176903e-15
RK23	Converged	0.026270	2339	8	0	8.333273e-02	8.736165e-06	2.212512e-06	4734	4718	4750	4718	0	0	0	9.590751e+03	1.559169	5.414875e+00
ROBOT	Converged	0.000543	61	8	0	6.593292e+00	2.113773e-07	1.122308e-06	164	152	180	152	0	0	0	1.046381e+03	2.567741	7.062284e+00
ROSENBR	Converged	0.000117	68	6	0	8.229432e-16	2.119861e-07	0.000000e+00	181	165	193	165	0	0	0	0.000000e+00	1.414214	0.000000e+00
ROSENMMX	Converged	0.009015	4152	8	4	-4.400000e+01	1.539575e-06	1.084542e-06	8659	8360	8675	8360	0	0	4001	1.006348e+02	44.068129	7.348469e-01
ROTDISC	MaxIter	42.533268	199568	200	199	9.495871e+00	2.170288e+10	4.962069e-01	405305	400613	405705	400613	0	0	0	4.736147e+12	651641.599568	2.156648e+11
S268	MaxIter	1.503133	196076	200	196	6.490394e-06	1.262714e-03	0.000000e+00	400281	392774	400681	392774	0	0	195991	2.236068e+00	5.552289	0.000000e+00
S365	NotFinite	0.000037	0	0	1	6.000012e+00	inf	NaN	1	2	2	2	0	0	0	2.236068e+00	6.519208	0.000000e+00
S365MOD	NotFinite	0.000037	0	0	1	6.000012e+00	inf	NaN	1	2	2	2	0	0	0	2.236068e+00	6.519208	0.000000e+00
S368	Converged	0.000354	13	5	0	-7.500000e-01	8.621629e-06	0.000000e+00	38	42	48	42	0	0	0	0.000000e+00	1.870832	0.000000e+00
SCOND1LS	NotFinite	0.659531	65	0	1	4.900071e+05	inf	0.000000e+00	236	138	237	138	0	0	0	0.000000e+00	700.0007	0.000000e+00

name	status	time	inner iterations	outer iterations	inner convergence failures	f	ε	δ	f evaluations	grad_f evaluations	g evaluations	grad_g evaluations	linesearch failures	L-BFGS failures	L-BFGS rejected	‖Σ‖	‖x‖	‖y‖
SMBANK	MaxIter	15.048057	200000	200	200	-7.102442e+06	5.373702e-01	2.019806e-08	1233567	785803	1233967	785803	2938	0	66282	7.994757e+08	1932014.788374	5.969756e+01
SMMPSF	MaxIter	20.834489	200000	200	200	1.345840e+06	4.185619e+03	2.400568e-06	605565	502691	605965	502691	0	0	0	8.789833e+08	7116.685553	8.252301e+02
SNAKE	MaxIter	4.789693	199014	200	199	-6.656941e+02	1.752792e+09	3.328554e-02	9193590	4076661	9193990	4076661	0	0	0	1.414214e+15	665.694148	4.707309e+13
SPANHYD	MaxIter	11.769303	200000	200	200	2.397380e+02	5.116065e-04	4.439673e-07	2624742	1507504	2625142	1507504	1	0	180401	1.246155e+03	4882.223981	1.089359e+01
STNQP2	MaxTime	90.305435	8122	10	7	-5.753859e+05	1.046941e+00	1.016476e-01	18803	17522	18823	17522	0	0	0	9.712385e+04	99.631595	4.860911e+03
STREG	MaxIter	0.252548	200000	200	200	7.571849e+06	1.178301e+00	0.000000e+00	426572	411610	426972	411610	0	0	198889	0.000000e+00	7566346.994523	0.000000e+00
STREGNE	Converged	0.018610	1858	6	1	5.577836e-11	7.472884e-06	4.480641e-07	9262	6453	9274	6453	9	0	0	1.001106e+02	1.414215	9.090786e-06
STRTCHDVNE	Converged	0.000507	30	6	0	0.000000e+00	4.620788e-06	1.262903e-11	72	78	84	78	0	0	0	8.808565e+01	3.593972	2.787426e-01
SUPERSIM	Converged	0.000081	23	6	0	6.666617e-01	2.648326e-07	4.993262e-06	60	64	72	64	0	0	0	1.414214e+01	0.942809	7.453560e-01
SWOPF	MaxIter	4.402767	199635	200	199	1.309694e-01	7.016537e-01	1.242351e-07	402034	400155	402434	400155	0	0	0	4.868821e+06	12.921387	5.345849e+00
SYNTHES1	Converged	0.000476	126	9	0	7.592778e-01	3.353037e-07	3.978663e-06	329	280	347	280	0	0	0	1.408801e+02	1.666706	4.245461e+00
SYNTHES2	Converged	0.032945	4305	13	4	-5.544473e-01	3.630742e-06	3.217340e-06	12878	10636	12904	10636	0	0	3827	2.249943e+03	4.324138	2.252465e+01
SYNTHES3	Converged	0.403047	6210	14	6	1.508219e+01	7.461254e-06	6.304435e-08	122716	67434	122744	67434	0	0	5717	1.311348e+03	3.845367	4.491478e+01
TABLE1	MaxIter	63.310136	200000	200	200	7.116966e+05	1.269423e+01	1.885395e-06	497526	448651	497926	448651	0	0	0	1.081595e+08	1683923.520877	5.860773e+01
TRUSPYR1	Converged	0.031058	4272	9	2	1.122871e+01	7.161342e-06	1.251182e-06	15751	12079	15769	12079	0	0	1780	1.000056e+03	12.930972	3.356887e+01
TRUSPYR2	Converged	0.786710	84791	88	83	1.122875e+01	4.586946e-06	4.041316e-07	404930	285454	405106	285454	84	0	78260	2.835647e+04	12.933415	4.608709e+01
TRY-B	Converged	0.000096	21	6	0	9.999990e-01	3.220801e-11	1.026230e-06	70	60	82	60	0	0	0	1.000000e+01	10.198039	1.000000e+00
TWIRISM1	MaxIter	46.924523	196890	200	196	-9.950387e-01	1.501898e-02	4.844435e-07	402967	398412	403367	398412	0	0	0	2.642228e+06	10.36158	4.062331e+00
TWOBARS	Converged	0.000118	33	6	0	1.508651e+00	3.524793e-06	7.403171e-07	96	86	108	86	0	0	0	1.000050e+02	1.461124	1.508649e+00
VIBRBEAMNE	MaxIter	20.872330	200000	200	200	0.000000e+00	9.485078e+12	8.698700e-01	1066050	729739	1066450	729739	0	0	158186	5.257746e+15	6.458338	2.166324e+15
WACHBIEG	Converged	0.000146	35	6	0	1.000000e+00	7.642049e-06	5.903824e-07	101	94	113	94	0	0	0	1.585334e+01	1.118034	5.000023e-01
WATER	Converged	0.603911	31544	37	31	1.054938e+04	8.727900e-06	5.722185e-06	147766	104991	147840	104991	0	0	30712	8.060725e+01	1254.050851	2.844349e+02
WOMFLET	Converged	0.000922	243	6	0	9.797660e-09	4.262910e-06	1.552908e-08	1306	840	1318	840	0	0	87	1.018903e+02	0.000003	6.946321e-01
YFITNE	Converged	1.208027	94173	100	94	0.000000e+00	9.809019e-06	4.389440e-07	209858	197789	210058	197789	0	0	93808	1.242140e+03	140.000308	2.353010e-01
YORKNET	MaxTime	91.251585	137000	137	137	2.804796e+04	9.781120e+08	5.674080e+00	3284489	1018026	3284763	1018026	8352	0	48925	3.464102e+15	773.451836	1.891181e+16
ZAMB2-10	MaxIter	18.492142	198046	200	198	-1.578420e+00	1.886445e-02	1.803901e-06	515045	455182	515445	455182	0	0	0	8.009696e+04	379.106699	2.353085e-02
ZAMB2-11	MaxIter	17.509551	197927	200	197	-1.091492e+00	1.979512e-02	3.986509e-07	509275	452158	509675	452158	0	0	0	3.752057e+05	230.09381	9.980535e-02
ZAMB2-8	Converged	0.523900	12604	16	12	-1.529357e-01	9.954414e-06	4.139542e-07	30436	27770	30468	27770	0	0	0	2.911526e+03	228.481591	4.887204e-02
ZAMB2-9	MaxIter	9.144760	197394	200	197	-3.539196e-01	1.759066e-03	1.969371e-07	527142	460473	527542	460473	0	0	0	1.192652e+05	260.604125	5.881597e-03
ZANGWIL3	Converged	0.000120	32	6	0	0.000000e+00	3.795635e-06	9.240721e-08	86	82	98	82	0	0	0	1.432275e+02	0.0	1.016026e-06
ZECEVIC2	Converged	0.000094	25	6	0	-4.125000e+00	8.291582e-07	1.546964e-07	74	70	86	70	0	0	0	1.004988e+02	1.767767	2.000001e+00
ZECEVIC3	Converged	0.000132	41	6	0	9.730939e+01	6.057012e-06	8.100653e-06	100	100	112	100	0	0	0	1.004988e+01	3.000001	8.023897e+00
ZECEVIC4	Converged	0.000100	25	6	0	7.557507e+00	3.813797e-06	2.604046e-07	77	68	89	68	0	0	0	1.004988e+01	5.126153	1.384138e+00
ZIGZAG	MaxTime	90.511172	85422	86	85	8.690897e+01	6.504117e+00	5.892314e-06	174702	172266	174874	172266	0	0	0	9.675346e+06	18.850263	2.869957e+00
ZY2	Converged	0.000080	9	6	0	2.000000e+00	8.624024e-07	1.779697e-08	38	36	50	36	0	0	0	1.004988e+01	2.0	2.500001e-01

In [8]:
```
def df_stats(df):
    conv = df['status'].value_counts()['Converged']
    tot = df['status'].count()
    tot_time = df['time'].sum()
    conv_time = df.where(df['status'] == 'Converged')['time'].sum()
    print(f'Converged:      {conv}/{tot} = {100*conv/tot:.02f}%')
    print(f'Total time:     {tot_time:.03f}s')
    print(f'Converged time: {conv_time:.03f}s')
```

In [9]:
```
print('Baseline\n---\n')
df_stats(base_df)
print('\n')
print('New test\n---\n')
df_stats(new_df)
print('\n')
```

```
Baseline
---

Converged:      313/501 = 62.48%
Total time:     6818.172s
Converged time: 775.703s


New test
---

Converged:      315/501 = 62.87%
Total time:     6790.729s
Converged time: 493.068s
```

In [10]:
```
def compare_results(a, b, columns):
#     res = pd.DataFrame()
#     for i, df in enumerate(dfs):
#         res[f'{column} {i}'] = df[column]
#     return res
    res = a[columns].join(b[columns], lsuffix=' 0', rsuffix=' 1')
    return res
```

In [11]:
```
cmp = compare_results(base_df, new_df, ['status', 'f', 'ε', 'δ']) #  'inner iterations', 'outer iterations',
cmp['imprv'] = cmp['f 0'] - cmp['f 1']
cmp['rel imprv'] = cmp['imprv'] / abs(cmp['f 0'])
cmp.style.applymap(color_negative_red_positive_green, subset=['imprv', 'rel imprv']) \
        .format('{:.2e}', subset=(cmp.dtypes == float))
```

Out[11]:

name	status 0	f 0	ε 0	δ 0	status 1	f 1	ε 1	δ 1	imprv	rel imprv
3PK	Converged	1.72e+00	9.26e-06	0.00e+00	Converged	1.72e+00	8.22e-06	0.00e+00	-9.26e-08	-5.38e-08
A4X12	MaxTime	8.41e-01	6.52e+01	9.84e-06	MaxTime	4.51e-01	6.78e+00	6.76e-06	3.90e-01	4.64e-01
A5ESSNDL	MaxTime	2.39e-06	1.19e-02	2.48e-04	MaxTime	1.97e-06	8.31e-03	1.13e-04	4.26e-07	1.78e-01
A5NSDSDM	Converged	0.00e+00	9.82e-06	2.38e-06	Converged	0.00e+00	9.71e-06	1.02e-06	0.00e+00	nan
A5NSSNSM	Converged	0.00e+00	9.82e-06	2.38e-06	Converged	0.00e+00	9.71e-06	1.02e-06	0.00e+00	nan
A5NSSSSL	MaxTime	8.67e-08	5.85e-03	2.72e-03	MaxTime	4.26e-06	1.68e-02	1.55e-02	-4.17e-06	-4.81e+01
ACOPP14	MaxIter	8.08e+03	3.03e-02	4.52e-08	MaxIter	8.08e+03	6.84e-02	2.15e-07	2.03e-03	2.51e-07
ACOPP30	MaxIter	5.79e+02	3.01e+02	1.46e-06	MaxIter	5.78e+02	6.00e+02	8.32e-07	9.49e-01	1.64e-03
ACOPR14	MaxIter	8.08e+03	1.88e-01	2.77e-07	MaxIter	8.08e+03	5.48e-02	1.45e-07	-8.51e-04	-1.05e-07
AIRCRFTA	Converged	0.00e+00	8.75e-06	1.34e-06	Converged	0.00e+00	7.21e-06	5.30e-07	0.00e+00	nan
AIRPORT	MaxTime	4.80e+04	1.03e-03	3.85e-07	MaxTime	4.80e+04	4.13e-04	7.73e-08	-3.21e-04	-6.69e-09
ALLINITA	Converged	3.33e+01	5.28e-06	1.33e-06	Converged	3.33e+01	1.94e-07	4.51e-06	1.83e-02	5.49e-04
ALLINITC	Converged	3.05e+01	2.59e-06	2.67e-07	Converged	3.05e+01	3.62e-06	5.32e-07	5.94e-03	1.95e-04
ALSOTAME	Converged	8.21e-02	2.46e-11	1.31e-08	Converged	8.21e-02	2.46e-11	1.31e-08	0.00e+00	0.00e+00
ANTWERP	MaxIter	2.49e+04	3.31e+02	1.43e-07	MaxIter	2.49e+04	8.01e+02	5.46e-07	-4.94e+00	-1.99e-04
AVGASA	Converged	-4.63e+00	8.57e-06	6.72e-06	Converged	-4.63e+00	8.57e-06	6.72e-06	0.00e+00	0.00e+00
AVGASB	Converged	-4.48e+00	9.76e-06	4.75e-06	Converged	-4.48e+00	5.50e-06	4.77e-06	1.95e-07	4.34e-08
AVION2	MaxIter	5.75e+08	7.82e+06	6.95e-07	MaxIter	5.04e+08	6.63e+06	1.22e-06	7.06e+07	1.23e-01
BA-L1	Converged	0.00e+00	5.45e-06	8.12e-09	Converged	0.00e+00	8.28e-06	8.44e-09	0.00e+00	nan
BA-L1SP	Converged	0.00e+00	6.13e-06	4.51e-09	Converged	0.00e+00	8.94e-06	2.92e-08	0.00e+00	nan
BARDNE	MaxIter	0.00e+00	4.02e+06	8.05e-02	MaxIter	0.00e+00	9.18e+06	8.05e-02	0.00e+00	nan
BATCH	MaxIter	2.59e+05	8.05e-01	1.68e-06	MaxIter	2.59e+05	1.57e+00	2.23e-06	-2.63e-01	-1.01e-06
BEALENE	Converged	0.00e+00	4.98e-07	3.71e-07	Converged	0.00e+00	3.79e-06	1.67e-07	0.00e+00	nan
BIGGS6NE	MaxIter	0.00e+00	1.43e+06	3.80e-02	MaxIter	0.00e+00	3.22e+06	3.80e-02	0.00e+00	nan
BIGGSC4	Converged	-2.45e+01	6.92e-06	3.75e-06	Converged	-2.45e+01	5.13e-06	3.95e-06	1.22e-07	4.99e-09
BOOTH	Converged	0.00e+00	5.53e-06	5.23e-08	Converged	0.00e+00	1.22e-08	1.31e-06	0.00e+00	nan
BOX3NE	Converged	0.00e+00	4.03e-06	1.80e-07	Converged	0.00e+00	5.69e-06	5.81e-08	0.00e+00	nan
BOXBOD	NotFinite	0.00e+00	nan	nan	NotFinite	0.00e+00	nan	nan	0.00e+00	nan
BRITGAS	Converged	0.00e+00	9.69e-06	3.86e-06	Converged	0.00e+00	9.77e-06	1.73e-06	0.00e+00	nan
BROWNBSNE	Converged	0.00e+00	7.45e-07	1.86e-07	Converged	0.00e+00	4.99e-06	3.49e-10	0.00e+00	nan
BT1	Converged	1.00e+00	7.43e-08	1.33e-08	Converged	-1.00e+00	3.51e-07	2.67e-07	2.00e+00	2.00e+00
BT10	Converged	-1.00e+00	2.94e-06	1.32e-06	Converged	-1.00e+00	2.97e-06	1.33e-06	2.43e-08	2.43e-08
BT11	Converged	8.25e-01	7.93e-07	1.78e-06	Converged	8.25e-01	7.80e-06	1.76e-06	1.55e-08	1.88e-08
BT12	Converged	6.19e+00	4.92e-06	4.59e-07	Converged	6.19e+00	4.10e-07	1.72e-08	-2.06e-08	-3.33e-09
BT13	Converged	0.00e+00	7.04e-06	1.51e-12	Converged	0.00e+00	6.58e-06	1.76e-10	0.00e+00	nan
BT2	Converged	3.26e-02	4.98e-06	4.86e-08	Converged	3.26e-02	3.26e-06	4.38e-10	-5.23e-10	-1.61e-08
BT3	Converged	4.09e+00	3.03e-06	7.20e-06	Converged	4.09e+00	4.99e-06	7.21e-06	9.02e-08	2.20e-08
BT4	Converged	-4.55e+01	7.75e-06	1.71e-06	Converged	-4.55e+01	3.60e-06	1.71e-06	1.24e-07	2.72e-09
BT5	Converged	9.62e+02	4.86e-06	1.91e-06	Converged	9.62e+02	3.48e-06	2.93e-08	2.29e-06	2.39e-09
BT6	Converged	2.77e-01	2.39e-06	6.45e-07	Converged	2.77e-01	6.94e-06	1.06e-07	-4.06e-08	-1.46e-07
BT7	Converged	3.06e+02	5.73e-06	2.44e-06	Converged	3.06e+02	6.35e-06	4.64e-07	-4.52e-03	-1.47e-05
BT8	Converged	1.00e+00	5.81e-06	1.83e-08	Converged	1.00e+00	7.29e-06	3.47e-08	-1.65e-08	-1.65e-08
BT9	Converged	-1.00e+00	1.25e-06	2.96e-06	Converged	-1.00e+00	5.46e-06	2.98e-06	2.23e-08	2.23e-08
BYRDSPHR	Converged	-4.68e+00	4.29e-06	2.69e-06	Converged	-4.68e+00	6.71e-06	2.25e-07	-1.52e-06	-3.24e-07
C-RELOAD	Converged	-1.02e+00	9.42e-06	7.00e-09	Converged	-1.02e+00	9.25e-06	1.15e-07	-4.91e-04	-4.83e-04
CANTILVR	Converged	1.34e+00	8.39e-06	2.67e-08	Converged	1.34e+00	2.69e-06	2.96e-07	-1.44e-07	-1.07e-07
CBS	MaxTime	1.13e+05	8.84e+01	7.86e-03	MaxTime	1.11e+05	1.49e+01	1.29e-03	1.35e+03	1.20e-02
CHACONN1	Converged	1.95e+00	2.94e-06	1.47e-07	Converged	1.95e+00	9.05e-06	1.36e-06	-5.44e-07	-2.78e-07
CHACONN2	Converged	2.00e+00	8.75e-06	7.44e-08	Converged	2.00e+00	3.14e-06	7.79e-08	-3.14e-08	-1.57e-08
CLEUVEN7	MaxTime	6.84e+02	7.92e+00	2.24e-06	MaxTime	6.84e+02	1.55e+00	1.15e-05	3.41e-02	4.98e-05
CLUSTER	Converged	0.00e+00	4.98e-08	3.65e-06	Converged	0.00e+00	1.33e-08	3.65e-06	0.00e+00	nan
COATINGNE	MaxIter	0.00e+00	2.28e+10	1.82e-01	MaxIter	0.00e+00	1.84e+11	1.82e-01	0.00e+00	nan
CONCON	MaxIter	-6.23e+03	3.04e-01	2.30e-07	MaxIter	-6.23e+03	1.99e+00	6.60e-08	2.08e-01	3.34e-05
CONGIGMZ	Converged	2.80e+01	4.31e-06	2.77e-06	Converged	2.80e+01	1.69e-06	1.23e-06	-1.23e-05	-4.38e-07
COOLHANS	MaxIter	0.00e+00	5.31e+09	2.02e-04	MaxIter	0.00e+00	6.61e+09	5.25e-04	0.00e+00	nan
COOLHANSLS	Converged	9.80e-07	8.27e-06	0.00e+00	MaxIter	3.00e-05	4.85e-05	0.00e+00	-2.90e-05	-2.96e+01
CORE2	MaxIter	7.69e+01	2.74e+11	1.53e-02	MaxIter	7.62e+01	2.30e+11	1.66e-02	7.78e-01	1.01e-02
CRESC50	NotFinite	2.88e+00	nan	nan	NotFinite	2.88e+00	nan	nan	0.00e+00	0.00e+00
CUBENE	Converged	0.00e+00	3.64e-06	3.24e-06	Converged	0.00e+00	5.83e-07	7.73e-08	0.00e+00	nan
DALLASM	MaxIter	-4.82e+04	1.72e-04	2.05e-06	MaxIter	-4.82e+04	1.48e-04	8.50e-07	-1.27e-04	-2.64e-09
DALLASS	MaxIter	-3.24e+04	1.54e-05	9.74e-07	MaxIter	-3.24e+04	7.36e-05	6.67e-07	-4.64e-04	-1.43e-08
DANIWOOD	MaxIter	0.00e+00	1.28e+07	3.68e-02	MaxIter	0.00e+00	1.21e+07	3.68e-02	0.00e+00	nan

name	status 0	f 0	ε 0	δ 0	status 1	f 1	ε 1	δ 1	imprv	rel imprv
DANWOOD	MaxIter	0.00e+00	2.08e+06	3.68e-02	MaxIter	0.00e+00	2.03e+07	3.68e-02	0.00e+00	nan
DECONVBNE	Converged	0.00e+00	9.61e-06	4.03e-06	Converged	0.00e+00	8.13e-06	1.98e-06	0.00e+00	nan
DECONVC	Converged	1.14e-08	6.01e-06	9.40e-07	Converged	1.13e-08	5.77e-06	9.10e-07	1.56e-11	1.37e-03
DECONVNE	Converged	0.00e+00	9.49e-06	5.74e-06	Converged	0.00e+00	9.49e-06	5.74e-06	0.00e+00	nan
DECONVU	Converged	1.16e-07	9.85e-06	0.00e+00	Converged	1.16e-07	7.50e-06	0.00e+00	3.47e-12	3.00e-05
DEGENLPA	MaxIter	3.06e+00	1.02e+02	8.86e-07	MaxIter	3.14e+00	1.76e+03	7.99e-07	-7.68e-02	-2.51e-02
DEGENLPB	MaxIter	-3.07e+01	1.78e+08	3.08e-07	MaxIter	-2.98e+01	4.94e+03	1.37e-13	-9.73e-01	-3.17e-02
DEMBO7	MaxIter	1.75e+02	8.42e-04	4.32e-08	MaxIter	1.75e+02	1.46e-03	1.62e-08	-2.86e-06	-1.63e-08
DEMYMALO	Converged	-3.00e+00	1.23e-06	7.91e-07	Converged	-3.00e+00	7.51e-06	2.60e-06	7.90e-07	2.63e-07
DIPIGRI	Converged	6.81e+02	8.86e-06	2.76e-07	Converged	6.81e+02	8.80e-06	7.14e-06	-2.86e-06	-4.20e-09
DISC2	Converged	1.56e+00	9.64e-06	5.59e-06	Converged	1.56e+00	8.72e-06	6.94e-06	1.99e-06	1.28e-06
DISCS	Converged	2.14e+01	8.55e-06	7.13e-06	Converged	1.20e+01	6.00e-06	8.10e-06	9.38e+00	4.39e-01
DIXCHLNG	MaxIter	4.27e+02	6.04e-05	9.86e-09	Converged	8.23e-08	5.12e-06	7.10e-06	4.27e+02	1.00e+00
DNIEPER	MaxIter	1.87e+04	1.68e-02	2.64e-07	MaxIter	1.87e+04	3.68e-02	1.58e-07	-1.31e-05	-7.00e-10
DUAL1	Converged	3.50e-02	8.37e-06	1.69e-07	Converged	3.50e-02	8.90e-06	6.30e-07	2.96e-08	8.46e-07
DUAL2	Converged	3.37e-02	9.68e-06	4.51e-08	Converged	3.37e-02	6.83e-06	3.52e-07	-1.43e-08	-4.23e-07
DUAL3	Converged	1.36e-01	6.32e-06	7.21e-07	Converged	1.36e-01	8.82e-06	3.21e-08	1.10e-07	8.09e-07
DUAL4	Converged	7.46e-01	6.95e-06	4.66e-07	Converged	7.46e-01	6.54e-06	4.70e-07	-3.08e-09	-4.13e-09
DUALC1	Converged	6.16e+03	2.36e-07	6.94e-06	Converged	6.16e+03	7.81e-06	6.94e-06	-2.87e-06	-4.66e-10
DUALC2	Converged	3.55e+03	4.52e-06	5.34e-08	Converged	3.55e+03	4.49e-06	5.33e-08	-7.16e-07	-2.02e-10
DUALC5	Converged	4.27e+02	9.08e-06	9.07e-09	Converged	4.27e+02	7.80e-07	1.20e-08	1.36e-06	3.18e-09
DUALC8	Converged	1.83e+04	7.89e-06	3.98e-08	MaxIter	1.83e+04	4.96e-03	2.92e-09	1.42e-03	7.76e-08
EG2	Converged	-9.99e+02	7.39e-13	0.00e+00	Converged	-9.99e+02	7.39e-13	0.00e+00	0.00e+00	0.00e+00
EQC	Converged	-8.30e+02	0.00e+00	0.00e+00	Converged	-8.30e+02	0.00e+00	0.00e+00	0.00e+00	0.00e+00
ERRINBAR	MaxIter	1.71e+05	8.64e+00	3.16e-07	MaxIter	3.12e+01	7.55e-01	2.11e-08	1.71e+05	1.00e+00
EXPFITA	Converged	1.14e-03	1.84e-06	3.85e-07	Converged	1.14e-03	9.10e-06	4.92e-07	-1.13e-10	-9.96e-08
EXPFITB	Converged	5.02e-03	2.69e-06	6.59e-06	Converged	5.02e-03	6.20e-06	8.59e-07	-4.86e-08	-9.69e-06
EXPFITC	Converged	2.33e-02	6.07e-06	1.78e-07	MaxIter	2.33e-02	2.33e-05	9.05e-07	-2.14e-08	-9.18e-07
EXPLIN	MaxIter	-7.19e+07	6.28e-03	0.00e+00	MaxIter	-7.19e+07	6.44e-04	0.00e+00	6.11e-07	8.49e-15
EXPLIN2	MaxIter	-7.20e+07	2.46e-03	0.00e+00	NotFinite	1.00e+02	inf	0.00e+00	-7.20e+07	-1.00e+00
EXPQUAD	MaxIter	-3.68e+09	3.21e-01	0.00e+00	NotFinite	1.00e+02	inf	0.00e+00	-3.68e+09	-1.00e+00
EXTROSNBNE	Converged	-2.00e+00	9.68e-06	2.41e-06	Converged	-2.00e+00	9.64e-06	6.01e-08	-9.20e-07	-4.60e-07
FCCU	Converged	1.11e+01	5.69e-06	5.15e-06	Converged	1.11e+01	5.45e-06	4.92e-06	-6.38e-07	-5.72e-08
FEEDLOC	Converged	0.00e+00	8.35e-06	1.04e-06	Converged	0.00e+00	5.88e-06	5.25e-07	0.00e+00	nan
FERRISDC	Converged	-4.96e-13	5.05e-07	1.66e-07	Converged	-4.96e-13	5.05e-07	1.66e-07	0.00e+00	0.00e+00
FLETCHER	MaxIter	3.92e+11	3.85e+03	1.95e-04	Converged	1.17e+01	2.97e-06	8.22e-07	3.92e+11	1.00e+00
FLOSP2TM	MaxTime	0.00e+00	6.55e+13	7.27e+00	MaxTime	0.00e+00	1.24e+15	9.79e+00	0.00e+00	nan
FREURONE	MaxIter	0.00e+00	1.70e+08	4.95e+00	MaxIter	0.00e+00	4.71e+09	4.95e+00	0.00e+00	nan
GAUSSELM	Converged	-1.00e+00	9.69e-06	5.19e-06	Converged	-1.00e+00	9.65e-06	4.76e-06	-2.18e-05	-2.18e-05
GENROSENE	MaxTime	0.00e+00	3.58e+01	4.98e+00	MaxTime	0.00e+00	8.79e-02	5.63e+00	0.00e+00	nan
GIGOMEZ1	Converged	-3.00e+00	1.46e-06	3.66e-07	Converged	-3.00e+00	3.01e-06	1.62e-07	5.61e-08	1.87e-08
GIGOMEZ2	Converged	1.95e+00	6.15e-06	8.98e-08	Converged	1.95e+00	6.15e-06	8.98e-08	0.00e+00	0.00e+00
GIGOMEZ3	Converged	2.00e+00	8.43e-07	1.41e-07	Converged	2.00e+00	7.66e-07	4.77e-07	-3.84e-07	-1.92e-07
GILBERT	Converged	2.46e+03	2.56e-06	6.10e-07	Converged	2.46e+03	6.81e-06	1.44e-06	3.32e-05	1.35e-08
GMNCASE1	Converged	2.67e-01	8.10e-06	1.74e-07	Converged	2.67e-01	5.93e-06	1.70e-07	-3.64e-07	-1.36e-06
GMNCASE2	Converged	-9.94e-01	9.69e-06	3.51e-06	Converged	-9.94e-01	7.88e-06	2.74e-06	-1.44e-07	-1.45e-07
GMNCASE3	Converged	1.52e+00	9.02e-06	7.18e-06	Converged	1.52e+00	8.42e-06	7.19e-06	-8.93e-08	-5.86e-08
GMNCASE4	MaxTime	5.93e+03	1.66e-04	1.95e-02	MaxTime	5.32e+03	6.35e-05	6.65e-01	6.09e+02	1.03e-01
GOFFIN	Converged	-9.85e-08	8.19e-06	1.07e-07	Converged	-1.10e-07	4.91e-06	1.19e-07	1.12e-08	1.14e-01
GOULDQP1	Converged	-3.49e+03	8.80e-06	1.78e-06	Converged	-3.49e+03	8.70e-06	1.37e-06	1.45e-04	4.17e-08
GOULDQP2	Converged	1.60e-12	3.47e-08	6.78e-09	Converged	1.60e-12	3.47e-08	6.78e-09	0.00e+00	0.00e+00
GOULDQP3	Converged	2.38e-05	6.53e-06	1.16e-06	Converged	2.38e-05	6.77e-06	6.38e-07	3.70e-10	1.56e-05
GRIDGENA	NotFinite	nan	inf	0.00e+00	NotFinite	nan	inf	0.00e+00	nan	nan
GRIDNETA	MaxTime	2.95e+02	1.45e-02	5.42e-02	MaxTime	3.11e+02	7.45e-03	3.69e-02	-1.60e+01	-5.43e-02
GRIDNETH	MaxTime	2.06e+02	9.58e-05	1.65e-05	MaxTime	2.06e+02	1.58e-05	3.64e-07	-4.45e-03	-2.15e-05
GRIDNETI	MaxTime	2.41e+02	1.23e-03	1.63e-02	MaxTime	2.42e+02	6.65e-04	7.57e-03	-1.54e+00	-6.40e-03
GROUPING	Converged	6.45e+00	7.95e-06	4.60e-06	NotFinite	2.51e+00	inf	2.12e-02	3.95e+00	6.12e-01
GROWTH	MaxIter	0.00e+00	2.75e-19	3.30e+01	MaxIter	0.00e+00	9.97e+09	5.55e-01	0.00e+00	nan
HADAMARD	MaxIter	7.07e-01	1.32e+08	1.81e+01	MaxIter	7.18e-01	9.94e+05	1.81e+01	-1.10e-02	-1.56e-02
HAHN1	MaxIter	0.00e+00	5.80e-01	1.20e+01	MaxIter	0.00e+00	6.45e+06	1.44e+00	0.00e+00	nan
HAIFAL	MaxTime	-1.04e+01	7.03e-01	1.04e-02	MaxTime	-1.06e+01	1.33e+00	1.56e-02	2.42e-01	2.33e-02
HAIFAM	MaxIter	7.63e+02	1.00e+02	0.00e+00	MaxIter	-7.94e+00	1.55e+00	4.27e-06	7.71e+02	1.01e+00
HAIFAS	Converged	-4.50e-01	4.85e-06	5.11e-08	Converged	-4.50e-01	8.16e-06	2.47e-07	1.30e-07	2.89e-07
HALDMADS	Converged	1.21e-04	9.16e-06	8.27e-06	Converged	1.21e-04	5.93e-06	3.01e-06	-4.98e-07	-4.13e-03
HANGING	MaxTime	-3.15e+04	1.83e-03	1.25e-06	MaxTime	-3.15e+04	1.41e-03	5.21e-07	2.83e-05	8.99e-10
HARKERP2	Converged	-5.00e-01	2.50e-06	0.00e+00	Converged	-5.00e-01	0.00e+00	0.00e+00	3.00e-12	6.01e-12
HATFLDDNE	MaxIter	0.00e+00	1.42e+28	3.58e+01	MaxIter	0.00e+00	5.14e+05	1.87e-04	0.00e+00	nan

name	status 0	f 0	ε 0	δ 0	status 1	f 1	ε 1	δ 1	imprv	rel imprv
HATFLDENE	MaxIter	0.00e+00	2.77e+06	8.00e-04	MaxIter	0.00e+00	2.71e+06	8.00e-04	0.00e+00	nan
HATFLDF	Converged	0.00e+00	1.93e-07	5.06e-09	Converged	0.00e+00	5.76e-07	4.05e-08	0.00e+00	nan
HATFLDFLNE	MaxIter	0.00e+00	6.38e+07	6.35e-03	MaxIter	0.00e+00	6.61e+07	6.34e-03	0.00e+00	nan
HATFLDG	Converged	0.00e+00	8.45e-06	2.35e-06	Converged	0.00e+00	8.28e-06	2.89e-06	0.00e+00	nan
HATFLDH	Converged	-2.45e+01	3.88e-06	4.40e-06	Converged	-2.45e+01	5.53e-06	4.10e-06	3.27e-07	1.33e-08
HEART6	MaxIter	0.00e+00	7.75e+13	2.48e-01	Converged	0.00e+00	5.52e-06	2.00e-08	0.00e+00	nan
HEART8	MaxIter	0.00e+00	1.37e+17	1.58e+00	MaxIter	0.00e+00	9.48e+10	7.46e-01	0.00e+00	nan
HELIXNE	Converged	0.00e+00	1.49e-06	4.02e-06	Converged	0.00e+00	1.98e-06	5.38e-08	0.00e+00	nan
HELSBY	MaxTime	3.75e+01	3.80e+06	1.36e-05	MaxTime	3.65e+01	7.08e+06	1.60e-05	9.47e-01	2.52e-02
HET-Z	Converged	1.00e+00	1.78e-12	9.82e-06	Converged	1.00e+00	1.78e-12	9.82e-06	0.00e+00	0.00e+00
HIE1327D	Converged	5.19e+02	8.74e-06	4.19e-07	MaxIter	5.19e+02	5.91e-03	1.22e-06	-4.46e-04	-8.59e-07
HIE1372D	Converged	2.78e+02	9.43e-06	1.69e-08	Converged	2.78e+02	9.62e-06	6.15e-07	-1.23e-06	-4.42e-09
HILBERTA	Converged	3.57e-13	2.02e-07	0.00e+00	Converged	3.57e-13	2.02e-07	0.00e+00	0.00e+00	0.00e+00
HILBERTB	Converged	1.24e-13	8.00e-06	0.00e+00	Converged	1.24e-13	8.00e-06	0.00e+00	0.00e+00	0.00e+00
HIMMELBA	Converged	0.00e+00	2.35e-06	1.89e-07	Converged	0.00e+00	1.31e-06	1.34e-07	0.00e+00	nan
HIMMELBB	Converged	7.55e-13	2.37e-06	0.00e+00	Converged	7.55e-13	2.37e-06	0.00e+00	0.00e+00	0.00e+00
HIMMELBC	Converged	0.00e+00	6.74e-06	1.02e-07	Converged	0.00e+00	2.91e-06	2.09e-07	0.00e+00	nan
HIMMELBCLS	Converged	4.84e-13	8.96e-06	0.00e+00	Converged	2.42e-19	2.01e-08	0.00e+00	4.84e-13	1.00e+00
HIMMELBD	MaxIter	0.00e+00	3.55e+10	2.43e+00	MaxIter	0.00e+00	3.14e+10	2.43e+00	0.00e+00	nan
HIMMELBE	Converged	0.00e+00	5.55e-06	7.19e-07	Converged	0.00e+00	8.18e-06	3.18e-06	0.00e+00	nan
HIMMELBF	MaxIter	3.19e+02	2.02e-05	0.00e+00	MaxIter	3.19e+02	3.03e-05	0.00e+00	3.75e-09	1.18e-11
HIMMELBFNE	MaxIter	0.00e+00	1.80e+14	1.26e+03	MaxIter	0.00e+00	3.00e+11	1.00e+04	0.00e+00	nan
HIMMELBG	Converged	1.71e-14	2.43e-06	0.00e+00	Converged	4.16e-13	6.97e-06	0.00e+00	-3.99e-13	-2.33e+01
HIMMELBH	Converged	-1.00e+00	2.52e-06	0.00e+00	Converged	-1.00e+00	4.23e-06	0.00e+00	-2.24e-13	-2.24e-13
HIMMELBI	Converged	-1.74e+03	6.43e-06	2.28e-06	NotFinite	-1.74e+03	inf	8.68e-04	8.45e-05	4.87e-08
HIMMELBJ	NotFinite	-3.10e+03	nan	nan	NotFinite	-3.10e+03	nan	nan	0.00e+00	0.00e+00
HIMMELBK	Converged	5.18e-02	3.29e-06	5.70e-07	Converged	5.18e-02	6.09e-06	3.00e-07	3.04e-09	5.86e-08
HIMMELP1	Converged	8.12e+01	1.07e-06	0.00e+00	Converged	-6.21e+01	2.40e-06	0.00e+00	1.43e+02	1.76e+00
HIMMELP2	Converged	-6.21e+01	7.17e-06	0.00e+00	Converged	-6.21e+01	2.40e-06	0.00e+00	1.39e-11	2.24e-13
HIMMELP3	Converged	-5.90e+01	0.00e+00	0.00e+00	Converged	-5.90e+01	0.00e+00	0.00e+00	0.00e+00	0.00e+00
HIMMELP4	NotFinite	-5.17e+01	inf	0.00e+00	Converged	-5.90e+01	0.00e+00	0.00e+00	7.28e+00	1.41e-01
HIMMELP5	Converged	-5.90e+01	0.00e+00	0.00e+00	Converged	-5.90e+01	0.00e+00	0.00e+00	0.00e+00	0.00e+00
HIMMELP6	Converged	-5.90e+01	0.00e+00	0.00e+00	Converged	-5.90e+01	0.00e+00	0.00e+00	0.00e+00	0.00e+00
HOLMES	MaxTime	1.25e+03	3.79e-05	0.00e+00	MaxTime	1.25e+03	3.90e-05	0.00e+00	-1.59e-11	-1.28e-14
HONG	Converged	2.26e+01	8.67e-06	3.91e-06	Converged	2.26e+01	8.56e-06	3.91e-06	-1.43e-08	-6.36e-10
HS10	Converged	-1.00e+00	6.67e-07	4.99e-07	Converged	-1.00e+00	1.69e-06	5.75e-06	2.62e-06	2.62e-06
HS100	Converged	6.81e+02	9.29e-06	8.63e-08	Converged	6.81e+02	9.48e-06	2.65e-06	-6.99e-07	-1.03e-09
HS100LNP	Converged	6.81e+02	9.91e-06	3.94e-08	Converged	6.81e+02	5.82e-06	4.37e-07	-5.25e-07	-7.71e-10
HS100MOD	Converged	6.79e+02	9.36e-06	1.19e-07	Converged	6.79e+02	9.98e-06	9.86e-07	1.03e-06	1.52e-09
HS101	NotFinite	9.90e+01	nan	nan	NotFinite	9.90e+01	nan	nan	3.99e-03	4.03e-05
HS102	NotFinite	2.21e+03	nan	nan	NotFinite	2.21e+03	nan	nan	0.00e+00	0.00e+00
HS103	NotFinite	2.21e+03	nan	nan	NotFinite	2.21e+03	nan	nan	0.00e+00	0.00e+00
HS104	NotFinite	5.28e-01	nan	3.17e-01	NotFinite	5.31e-01	nan	3.17e-01	-2.66e-03	-5.04e-03
HS105	Converged	1.04e+03	7.09e-06	0.00e+00	Converged	1.04e+03	4.67e-06	0.00e+00	-4.09e-11	-3.92e-14
HS106	MaxIter	1.50e+04	1.00e+00	0.00e+00	MaxIter	8.54e+03	1.00e+00	0.00e+00	6.44e+03	4.30e-01
HS107	Converged	5.06e+03	8.23e-06	8.72e-06	Converged	5.06e+03	9.62e-06	2.54e-09	-4.20e-07	-8.31e-11
HS108	Converged	-8.66e-01	4.32e-06	2.80e-06	Converged	-8.66e-01	4.39e-06	3.15e-06	-4.92e-08	-5.69e-08
HS109	MaxIter	5.37e+03	6.61e+11	1.22e-05	MaxIter	5.43e+03	9.77e+11	1.34e-05	-6.16e+01	-1.15e-02
HS11	Converged	-8.50e+00	5.97e-06	3.76e-06	Converged	-8.50e+00	5.97e-06	3.76e-06	0.00e+00	0.00e+00
HS110	Converged	-4.58e+01	1.03e-06	0.00e+00	Converged	-4.58e+01	1.03e-06	0.00e+00	0.00e+00	0.00e+00
HS111	NotFinite	-6.81e+01	inf	1.41e+01	Converged	-4.78e+01	4.48e-06	1.22e-06	-2.03e+01	-2.98e-01
HS111LNP	NotFinite	-6.81e+01	inf	1.41e+01	Converged	-4.78e+01	4.48e-06	1.22e-06	-2.03e+01	-2.98e-01
HS112	Converged	-4.78e+01	4.44e-06	2.96e-06	NotFinite	-5.29e+02	nan	nan	4.82e+02	1.01e+01
HS113	Converged	2.43e+01	9.83e-06	1.91e-06	MaxIter	2.43e+01	1.24e-04	4.50e-07	1.88e-06	7.72e-08
HS114	MaxIter	-1.77e+03	1.31e-03	2.32e-07	MaxIter	-1.77e+03	2.98e-04	5.18e-07	1.05e-06	5.95e-10
HS116	MaxIter	1.43e+02	2.05e-01	3.07e-07	MaxIter	1.55e+02	1.42e-01	2.03e-06	-1.19e+01	-8.33e-02
HS117	MaxIter	3.23e+01	2.24e-04	7.21e-08	MaxIter	3.23e+01	2.67e-04	5.98e-08	-5.05e-08	-1.56e-09
HS118	Converged	6.65e+02	5.15e-06	1.92e-06	Converged	6.65e+02	3.55e-06	3.70e-06	1.13e-06	1.69e-09
HS119	Converged	2.45e+02	6.19e-06	9.84e-07	Converged	2.45e+02	9.58e-06	9.59e-07	2.25e-06	9.20e-09
HS12	Converged	-3.00e+01	1.10e-06	5.32e-09	Converged	-3.00e+01	9.13e-06	7.28e-09	-6.30e-09	-2.10e-10
HS13	Converged	9.59e-01	3.64e-07	9.08e-06	Converged	9.59e-01	3.64e-07	9.08e-06	4.36e-09	4.54e-09
HS14	Converged	1.39e+00	5.07e-06	2.12e-06	Converged	1.39e+00	4.45e-07	4.04e-06	4.45e-06	3.20e-06
HS15	Converged	3.06e+02	4.55e-13	7.60e-07	Converged	3.06e+02	4.55e-13	7.60e-07	0.00e+00	0.00e+00
HS16	Converged	2.50e-01	5.76e-06	0.00e+00	Converged	2.50e-01	8.14e-06	0.00e+00	-1.83e-15	-7.33e-15
HS17	Converged	1.00e+00	1.58e-07	2.05e-06	Converged	1.00e+00	1.28e-07	2.06e-06	-3.87e-09	-3.87e-09
HS18	Converged	5.00e+00	6.87e-06	1.63e-07	Converged	5.00e+00	6.88e-06	1.12e-07	-1.03e-08	-2.06e-09
HS19	Converged	-6.96e+03	1.62e-06	1.58e-06	Converged	-6.96e+03	2.10e-06	1.05e-06	5.98e-03	8.60e-07

name	status 0	f 0	ε 0	δ 0	status 1	f 1	ε 1	δ 1	imprv	rel imprv
HS2	Converged	4.94e+00	1.17e-06	0.00e+00	Converged	4.94e+00	1.17e-06	0.00e+00	0.00e+00	0.00e+00
HS20	Converged	3.82e+01	4.71e-09	6.27e-06	Converged	3.82e+01	6.01e-09	6.27e-06	-1.27e-08	-3.31e-10
HS21	Converged	-1.00e+02	3.82e-06	0.00e+00	Converged	-1.00e+02	3.82e-06	0.00e+00	0.00e+00	0.00e+00
HS21MOD	Converged	-9.60e+01	4.30e-06	0.00e+00	Converged	-9.60e+01	4.30e-06	0.00e+00	0.00e+00	0.00e+00
HS22	Converged	1.00e+00	4.31e-06	8.38e-06	Converged	1.00e+00	3.46e-07	8.92e-06	2.83e-07	2.83e-07
HS23	Converged	2.00e+00	2.99e-06	1.71e-07	Converged	2.00e+00	7.14e-08	3.79e-06	8.15e-06	4.08e-06
HS24	Converged	0.00e+00	0.00e+00	0.00e+00	Converged	-1.00e+00	6.67e-06	1.72e-06	1.00e+00	inf
HS25	Converged	4.84e-11	3.42e-06	0.00e+00	Converged	1.37e-11	1.89e-06	0.00e+00	3.48e-11	7.18e-01
HS25NE	NotFinite	0.00e+00	nan	3.68e-02	Converged	0.00e+00	6.01e-06	5.88e-06	0.00e+00	nan
HS26	Converged	4.31e-10	5.34e-07	3.48e-09	Converged	9.70e-13	6.09e-06	6.65e-08	4.30e-10	9.98e-01
HS268	MaxIter	2.91e-11	5.15e-04	0.00e+00	MaxIter	6.49e-06	1.26e-03	0.00e+00	-6.49e-06	-2.23e+05
HS27	Converged	4.00e-02	2.69e-07	3.84e-06	Converged	4.00e-02	1.69e-06	3.99e-07	-1.70e-07	-4.24e-06
HS28	Converged	5.85e-11	5.50e-06	5.15e-08	Converged	1.63e-11	4.44e-06	2.57e-09	4.22e-11	7.21e-01
HS29	Converged	-2.26e+01	4.48e-06	1.48e-07	Converged	-2.26e+01	2.18e-06	7.42e-08	-1.57e-07	-6.96e-09
HS2NE	MaxIter	0.00e+00	2.50e+00	2.22e+00	MaxIter	0.00e+00	3.18e+01	2.22e+00	0.00e+00	nan
HS3	Converged	1.42e-08	3.84e-06	0.00e+00	Converged	1.42e-08	3.84e-06	0.00e+00	0.00e+00	0.00e+00
HS30	Converged	1.00e+00	0.00e+00	0.00e+00	Converged	1.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
HS31	Converged	6.00e+00	4.94e-06	7.63e-08	Converged	6.00e+00	5.86e-07	2.89e-07	2.19e-06	3.66e-07
HS32	Converged	1.00e+00	4.31e-06	1.55e-07	Converged	1.00e+00	3.31e-06	1.28e-07	-5.39e-08	-5.39e-08
HS33	Converged	-4.00e+00	1.80e-07	1.68e-06	Converged	-4.00e+00	1.80e-07	1.68e-06	0.00e+00	0.00e+00
HS34	Converged	-8.34e-01	8.64e-06	6.93e-07	Converged	-8.34e-01	3.89e-06	1.73e-06	-7.09e-07	-8.50e-07
HS35	Converged	1.11e-01	7.27e-06	5.91e-07	Converged	1.11e-01	8.24e-06	6.38e-07	-1.05e-08	-9.45e-08
HS35I	Converged	1.11e-01	7.27e-06	5.91e-07	Converged	1.11e-01	8.24e-06	6.38e-07	-1.05e-08	-9.45e-08
HS35MOD	Converged	2.50e-01	4.97e-06	0.00e+00	Converged	2.50e-01	3.33e-06	0.00e+00	-1.32e-12	-5.27e-12
HS36	Converged	-3.30e+03	2.84e-14	2.05e-07	Converged	-3.30e+03	2.84e-14	2.05e-07	0.00e+00	0.00e+00
HS37	Converged	-3.46e+03	4.31e-06	2.03e-06	Converged	-3.46e+03	4.30e-06	2.03e-06	2.80e-07	8.11e-11
HS38	Converged	2.47e-15	6.02e-07	0.00e+00	Converged	2.14e-14	9.93e-06	0.00e+00	-1.89e-14	-7.66e+00
HS39	Converged	-1.00e+00	1.25e-06	2.96e-06	Converged	-1.00e+00	5.46e-06	2.98e-06	2.23e-08	2.23e-08
HS3MOD	Converged	4.67e-14	4.18e-06	0.00e+00	Converged	1.02e-15	1.39e-06	0.00e+00	4.57e-14	9.78e-01
HS4	Converged	2.67e+00	0.00e+00	0.00e+00	Converged	2.67e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
HS40	Converged	-2.50e-01	2.53e-06	6.15e-06	Converged	-2.50e-01	7.22e-06	6.11e-06	1.47e-08	5.88e-08
HS41	Converged	1.93e+00	1.25e-07	4.34e-07	Converged	1.93e+00	1.08e-06	4.20e-07	1.57e-09	8.14e-10
HS42	Converged	1.39e+01	1.90e-06	3.12e-06	Converged	1.39e+01	2.78e-06	3.49e-06	1.48e-06	1.07e-07
HS43	Converged	-4.40e+01	3.46e-06	2.51e-06	Converged	-4.40e+01	4.58e-06	3.73e-06	1.14e-06	2.58e-08
HS44	Converged	-1.50e+01	6.10e-07	8.49e-07	Converged	-1.50e+01	1.58e-07	7.95e-07	-7.72e-08	-5.15e-09
HS44NEW	Converged	-1.50e+01	5.86e-07	7.41e-07	Converged	-1.50e+01	1.48e-07	8.06e-07	3.25e-09	2.16e-10
HS45	Converged	1.00e+00	0.00e+00	0.00e+00	Converged	1.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
HS46	Converged	1.97e-13	8.67e-06	2.37e-06	Converged	7.64e-12	9.11e-06	2.37e-06	-7.45e-12	-3.78e+01
HS47	Converged	-5.68e-12	7.15e-06	9.73e-07	Converged	-5.68e-12	7.15e-06	9.73e-07	0.00e+00	0.00e+00
HS48	Converged	1.93e-12	7.37e-06	6.67e-07	Converged	1.76e-11	8.10e-06	6.02e-09	-1.56e-11	-8.11e+00
HS49	Converged	9.15e-13	7.32e-06	5.93e-07	Converged	1.21e-11	7.61e-06	3.74e-07	-1.12e-11	-1.22e+01
HS5	Converged	-1.91e+00	5.21e-06	0.00e+00	Converged	-1.91e+00	5.21e-06	0.00e+00	0.00e+00	0.00e+00
HS50	Converged	3.10e-11	8.37e-06	5.77e-06	Converged	1.89e-13	5.32e-06	3.86e-07	3.08e-11	9.94e-01
HS51	Converged	3.49e-10	6.06e-06	9.27e-06	Converged	3.13e-10	3.06e-06	8.60e-06	3.58e-11	1.03e-01
HS52	Converged	5.33e+00	5.56e-06	2.37e-06	Converged	5.33e+00	9.56e-06	2.37e-06	-3.06e-07	-5.75e-08
HS53	Converged	4.09e+00	8.40e-06	1.01e-06	Converged	4.09e+00	8.99e-06	9.60e-07	-2.33e-07	-5.70e-08
HS54	MaxIter	-1.56e-01	7.55e-05	1.82e-12	Converged	-8.67e-01	3.81e-06	2.66e-06	7.11e-01	4.56e+00
HS55	Converged	6.33e+00	8.36e-06	2.18e-06	Converged	6.67e+00	7.84e-06	1.67e-06	-3.33e-01	-5.26e-02
HS56	Converged	-3.46e+00	8.21e-06	2.68e-07	Converged	-3.46e+00	1.34e-06	2.99e-07	4.45e-08	1.29e-08
HS57	Converged	3.06e-02	4.39e-06	0.00e+00	Converged	3.06e-02	4.39e-06	0.00e+00	0.00e+00	0.00e+00
HS59	Converged	-6.75e+00	7.05e-06	0.00e+00	Converged	-6.75e+00	7.05e-06	0.00e+00	0.00e+00	0.00e+00
HS6	Converged	1.29e-13	2.87e-07	1.67e-08	Converged	9.46e-12	2.46e-06	1.56e-08	-9.33e-12	-7.24e+01
HS60	Converged	3.26e-02	6.17e-06	1.33e-07	Converged	3.26e-02	7.42e-07	1.49e-07	-1.73e-10	-5.31e-09
HS61	Converged	-1.44e+02	3.59e-06	2.66e-07	Converged	-1.44e+02	2.81e-06	5.31e-08	-4.27e-07	-2.97e-09
HS62	Converged	-2.63e+04	1.78e-06	9.48e-09	Converged	-2.63e+04	5.84e-06	2.48e-07	1.52e-03	5.79e-08
HS63	Converged	9.62e+02	8.07e-06	7.40e-08	Converged	9.62e+02	3.63e-06	1.87e-08	2.91e-09	3.03e-12
HS64	Converged	6.30e+03	3.34e-06	2.61e-06	Converged	6.30e+03	3.35e-06	2.61e-06	6.19e-06	9.83e-10
HS65	Converged	9.54e-01	6.79e-06	1.23e-07	Converged	9.54e-01	4.05e-07	2.16e-08	8.36e-09	8.77e-09
HS66	Converged	5.18e-01	1.68e-06	5.18e-06	Converged	5.18e-01	2.56e-06	3.42e-07	-3.43e-06	-6.62e-06
HS67	NotFinite	-8.69e+02	nan	nan	NotFinite	-8.69e+02	nan	nan	0.00e+00	0.00e+00
HS68	Converged	-9.20e-01	5.91e-06	2.62e-06	Converged	-9.20e-01	3.41e-06	2.62e-06	1.04e-09	1.13e-09
HS69	MaxIter	-9.57e+02	1.32e-04	2.26e-08	Converged	-9.57e+02	9.01e-06	2.24e-06	9.10e-05	9.51e-08
HS7	Converged	-1.73e+00	1.63e-06	8.11e-09	Converged	-1.73e+00	1.63e-06	8.11e-09	0.00e+00	0.00e+00
HS70	Converged	7.50e-03	4.21e-06	0.00e+00	Converged	7.50e-03	5.55e-06	0.00e+00	4.66e-11	6.21e-09
HS71	Converged	1.70e+01	1.55e-06	1.02e-07	Converged	1.70e+01	1.97e-06	7.80e-08	-3.10e-08	-1.82e-09
HS72	Converged	7.28e+02	2.91e-06	2.71e-06	Converged	7.28e+02	2.91e-06	2.71e-06	0.00e+00	0.00e+00
HS73	Converged	2.99e+01	5.94e-07	1.21e-07	Converged	2.99e+01	5.49e-06	7.83e-08	-4.27e-07	-1.43e-08

name	status 0	f 0	ε 0	δ 0	status 1	f 1	ε 1	δ 1	imprv	rel imprv
HS74	MaxIter	5.13e+03	7.03e-05	9.72e-10	MaxIter	5.13e+03	3.70e-02	8.67e-10	4.82e-09	9.41e-13
HS75	Converged	5.17e+03	4.01e-06	2.34e-07	MaxIter	5.17e+03	1.50e-01	3.19e-08	-9.53e-05	-1.84e-08
HS76	Converged	-4.68e+00	7.34e-07	2.97e-07	Converged	-4.68e+00	4.14e-06	5.77e-07	-3.97e-07	-8.48e-08
HS76I	Converged	-4.68e+00	7.34e-07	2.97e-07	Converged	-4.68e+00	4.14e-06	5.77e-07	-3.97e-07	-8.48e-08
HS77	Converged	2.42e-01	3.94e-06	7.88e-08	Converged	2.42e-01	6.60e-06	2.55e-08	-4.92e-09	-2.04e-08
HS78	Converged	-2.92e+00	9.84e-06	2.52e-07	Converged	-2.92e+00	8.24e-06	3.32e-07	3.08e-08	1.06e-08
HS79	Converged	7.88e-02	5.53e-06	2.06e-07	Converged	7.88e-02	7.41e-06	7.13e-07	-1.44e-09	-1.83e-08
HS8	Converged	-1.00e+00	1.49e-06	5.70e-08	Converged	-1.00e+00	6.00e-06	2.12e-07	0.00e+00	0.00e+00
HS80	Converged	5.39e-02	1.97e-06	8.12e-08	Converged	5.39e-02	1.97e-06	8.12e-08	0.00e+00	0.00e+00
HS81	Converged	5.39e-02	2.20e-06	2.39e-06	Converged	5.39e-02	2.20e-06	2.39e-06	0.00e+00	0.00e+00
HS83	Converged	-3.07e+04	1.95e-06	2.35e-06	Converged	-3.07e+04	4.93e-06	2.41e-06	1.86e-05	6.05e-10
HS84	MaxIter	-5.28e+06	1.36e+02	3.95e-07	MaxIter	-5.28e+06	2.47e-02	0.00e+00	7.54e-06	1.43e-12
HS85	MaxTime	-2.18e+00	1.07e+00	8.74e-04	Converged	-2.22e+00	6.85e-06	1.79e-06	3.25e-02	1.49e-02
HS86	Converged	-3.23e+01	4.53e-06	4.92e-06	Converged	-3.23e+01	4.51e-06	4.92e-06	1.16e-08	3.59e-10
HS87	MaxIter	9.20e+03	3.82e+03	4.98e-09	MaxIter	9.00e+03	7.21e-01	1.89e-07	2.00e+02	2.17e-02
HS88	Converged	1.36e+00	2.44e-06	1.05e-06	Converged	1.36e+00	2.78e-06	1.05e-06	1.05e-08	7.69e-09
HS89	Converged	1.36e+00	1.92e-06	1.00e-06	Converged	1.36e+00	3.76e-07	1.00e-06	1.61e-08	1.18e-08
HS9	Converged	-5.00e-01	5.41e-07	4.38e-08	Converged	-5.00e-01	5.41e-07	4.38e-08	0.00e+00	0.00e+00
HS90	Converged	1.36e+00	1.42e-07	1.05e-06	Converged	1.36e+00	2.86e-07	1.05e-06	1.31e-09	9.60e-10
HS91	Converged	1.36e+00	9.60e-06	3.89e-15	Converged	1.36e+00	7.23e-07	1.05e-06	1.11e-03	8.13e-04
HS92	Converged	1.36e+00	1.20e-06	1.00e-06	Converged	1.36e+00	7.20e-06	7.90e-08	-9.77e-04	-7.17e-04
HS93	MaxIter	0.00e+00	0.00e+00	2.07e+00	MaxIter	0.00e+00	0.00e+00	2.07e+00	0.00e+00	nan
HS95	Converged	1.56e-02	5.75e-12	0.00e+00	Converged	1.56e-02	5.75e-12	0.00e+00	0.00e+00	0.00e+00
HS96	Converged	1.56e-02	5.75e-12	0.00e+00	Converged	1.56e-02	5.75e-12	0.00e+00	0.00e+00	0.00e+00
HS97	Converged	4.07e+00	1.27e-10	4.68e-06	Converged	3.14e+00	2.22e-12	1.01e-06	9.35e-01	2.30e-01
HS98	Converged	4.07e+00	2.68e-11	1.84e-06	Converged	3.14e+00	2.22e-12	1.01e-06	9.35e-01	2.30e-01
HS99	MaxIter	-8.31e+08	3.64e+05	3.93e-09	MaxIter	-8.31e+08	3.06e+04	6.98e-07	1.37e-03	1.65e-12
HS99EXP	MaxIter	-3.28e+11	5.27e+20	2.03e+05	MaxIter	-1.23e+11	4.91e+18	1.35e+05	-2.05e+11	-6.25e-01
HUBFIT	Converged	1.69e-02	5.68e-06	1.96e-06	Converged	1.69e-02	5.56e-06	1.92e-06	-4.73e-09	-2.80e-07
HUES-MOD	Converged	3.48e+07	3.42e-06	6.77e-06	Converged	3.48e+07	3.81e-06	1.15e-06	9.23e-01	2.65e-08
HUESTIS	MaxTime	1.74e+11	7.46e-02	4.65e-07	Converged	1.74e+11	9.14e-06	7.47e-06	6.97e+03	4.00e-08
HVYCRASH	MaxTime	-1.60e-01	4.48e+00	2.96e-02	MaxTime	3.74e-02	1.32e+00	1.03e-01	-1.98e-01	-1.23e+00
HYDCAR20	MaxIter	0.00e+00	6.33e+12	5.68e-02	MaxIter	0.00e+00	1.05e+13	6.34e-02	0.00e+00	nan
HYDCAR6	MaxIter	0.00e+00	1.51e+12	1.97e-02	MaxIter	0.00e+00	3.93e+11	1.34e-02	0.00e+00	nan
HYDROELL	Converged	-3.59e+06	6.42e-06	9.52e-06	Converged	-3.59e+06	9.74e-06	3.01e-06	-9.56e-04	-2.67e-10
HYDROELM	Converged	-3.58e+06	9.87e-06	7.38e-06	Converged	-3.58e+06	9.18e-06	5.56e-06	1.50e-02	4.19e-09
HYDROELS	Converged	-3.58e+06	8.68e-06	6.46e-06	Converged	-3.58e+06	7.23e-06	8.35e-06	-6.78e-04	-1.89e-10
HYPCIR	Converged	0.00e+00	9.96e-06	3.41e-06	Converged	0.00e+00	1.16e-06	2.32e-07	0.00e+00	nan
INTEGREQ	Converged	0.00e+00	9.45e-06	1.51e-06	Converged	0.00e+00	9.45e-06	1.51e-06	0.00e+00	nan
INTEQNE	Converged	0.00e+00	8.89e-06	2.14e-06	Converged	0.00e+00	8.89e-06	2.14e-06	0.00e+00	nan
JANNSON3	MaxTime	2.00e+04	6.99e-03	3.03e-08	MaxTime	2.00e+04	8.34e-03	1.47e-05	4.62e-06	2.31e-10
JANNSON4	Converged	9.80e+03	1.85e-07	6.87e-06	Converged	9.80e+03	7.08e-07	7.26e-06	3.79e-05	3.86e-09
JENSMPNE	MaxIter	0.00e+00	5.47e+04	4.72e+00	MaxIter	0.00e+00	1.46e+04	4.72e+00	0.00e+00	nan
JJTABEL3	MaxTime	7.20e+07	3.53e+02	1.02e-04	MaxIter	7.14e+07	9.16e+01	3.21e-06	6.00e+05	8.33e-03
JUDGENE	MaxIter	0.00e+00	1.22e+08	2.08e+00	MaxIter	0.00e+00	5.61e+07	2.08e+00	0.00e+00	nan
JUNKTURN	MaxTime	7.89e-03	7.04e-01	2.83e-04	MaxTime	1.02e-03	9.43e-04	1.04e-04	6.87e-03	8.71e-01
KIRBY2	MaxIter	0.00e+00	1.90e+15	6.82e-01	MaxIter	0.00e+00	1.34e+15	5.56e-01	0.00e+00	nan
KISSING	MaxIter	4.47e-01	8.76e-06	1.00e+00	MaxIter	4.47e-01	4.33e-06	1.00e+00	9.01e-09	2.01e-08
KISSING2	Converged	5.27e+00	9.31e-06	5.12e-07	Converged	6.22e+00	9.84e-06	3.01e-07	-9.51e-01	-1.81e-01
KIWCRESC	Converged	-1.07e-06	8.13e-07	1.42e-06	Converged	-9.35e-08	3.27e-06	1.04e-07	-9.77e-07	-9.13e-01
KOWOSBNE	MaxIter	0.00e+00	1.46e+06	1.12e-02	MaxIter	0.00e+00	7.45e+05	1.12e-02	0.00e+00	nan
KSIP	Converged	5.76e-01	5.27e-06	4.09e-06	Converged	5.76e-01	9.04e-06	5.73e-06	6.01e-07	1.04e-06
KTMODEL	NotFinite	0.00e+00	inf	nan	NotFinite	0.00e+00	inf	nan	0.00e+00	nan
LAKES	NotFinite	7.35e+11	nan	nan	NotFinite	7.35e+11	nan	nan	0.00e+00	0.00e+00
LANCZOS1	Converged	0.00e+00	8.32e-06	2.63e-06	MaxIter	0.00e+00	3.45e+08	3.08e-04	0.00e+00	nan
LANCZOS2	MaxIter	0.00e+00	2.12e+06	8.95e-04	MaxIter	0.00e+00	4.10e+08	3.15e-04	0.00e+00	nan
LANCZOS3	MaxIter	0.00e+00	1.93e+05	4.44e-05	NotFinite	0.00e+00	nan	1.36e-03	0.00e+00	nan
LAUNCH	MaxIter	1.07e+01	6.28e+00	2.36e-06	NotFinite	1.06e+01	nan	1.52e-06	2.97e-02	2.79e-03
LCH	NotFinite	2.26e+35	nan	1.69e+03	NotFinite	1.12e+43	inf	6.11e+19	-1.12e+43	-4.94e+07
LEAKNET	MaxIter	8.11e+00	1.39e+04	1.04e-06	MaxIter	8.13e+00	1.70e+04	3.27e-06	-2.41e-02	-2.97e-03
LEUVEN7	MaxTime	6.95e+02	5.23e+00	1.53e-04	MaxTime	6.95e+02	2.06e+00	1.14e-06	1.14e-02	1.65e-05
LEWISPOL	MaxIter	3.00e+00	5.62e-04	8.37e-10	MaxIter	3.00e+00	3.51e-04	7.75e-10	-1.78e-05	-5.92e-06
LIARWHDNE	Converged	0.00e+00	2.33e-06	1.00e-06	Converged	0.00e+00	7.93e-06	1.12e-08	0.00e+00	nan
LIN	NotFinite	-4.65e-11	inf	nan	NotFinite	-4.65e-11	inf	nan	0.00e+00	0.00e+00
LINCONT	MaxTime	0.00e+00	9.56e+16	1.43e+01	MaxTime	0.00e+00	2.44e+16	1.42e+01	0.00e+00	nan
LINSPANH	Converged	-7.70e+01	8.87e-06	3.41e-06	Converged	-7.70e+01	8.04e-06	2.49e-06	0.00e+00	0.00e+00
LISWET12	MaxTime	5.74e+00	4.49e+02	1.87e-03	MaxTime	5.53e+00	1.13e+02	1.60e-03	2.06e-01	3.58e-02

name	status 0	f 0	ε 0	δ 0	status 1	f 1	ε 1	δ 1	imprv	rel imprv
LISWET9	MaxTime	9.53e+00	2.57e+02	2.14e-02	MaxTime	1.12e+01	2.50e+02	1.08e-02	-1.63e+00	-1.71e-01
LOADBAL	Converged	4.53e-01	9.85e-06	3.84e-06	Converged	4.53e-01	9.80e-06	7.31e-06	-2.71e-08	-5.98e-08
LOOTSMA	MaxIter	0.00e+00	6.00e+00	2.00e+00	MaxIter	0.00e+00	6.00e+00	2.00e+00	0.00e+00	nan
LOTSCHD	Converged	2.40e+03	3.07e-06	3.06e-06	Converged	2.40e+03	9.15e-06	7.45e-07	-1.23e-04	-5.13e-08
LSC1	MaxIter	0.00e+00	2.40e+07	1.96e+00	MaxIter	0.00e+00	1.25e+07	1.96e+00	0.00e+00	nan
LSC2	MaxIter	0.00e+00	9.60e+09	2.08e+00	MaxIter	0.00e+00	2.29e+10	1.94e+00	0.00e+00	nan
LSNNODOC	Converged	1.23e+02	1.23e-06	5.01e-07	Converged	1.23e+02	5.48e-06	4.33e-07	-1.34e-06	-1.08e-08
LSQFIT	Converged	3.38e-02	9.69e-06	3.39e-06	Converged	3.38e-02	9.93e-06	3.48e-06	2.16e-08	6.38e-07
LUKVLE18	MaxTime	1.03e+04	4.52e+01	3.76e-04	MaxTime	9.80e+03	7.22e-04	4.51e-03	5.33e+02	5.16e-02
LUKVLI1	MaxTime	9.48e+03	1.06e+01	5.43e-02	MaxTime	9.01e+03	9.05e+00	2.76e-02	4.77e+02	5.03e-02
LUKVLI10	MaxTime	3.54e+03	9.53e-05	9.59e-06	MaxTime	3.54e+03	5.66e-05	3.13e-06	-1.89e-04	-5.35e-08
LUKVLI11	Converged	4.61e-07	9.80e-06	8.25e-06	Converged	4.17e-09	8.53e-06	9.65e-06	4.57e-07	9.91e-01
LUKVLI12	Converged	2.01e-06	9.20e-06	0.00e+00	Converged	1.70e-06	9.06e-06	0.00e+00	3.16e-07	1.57e-01
LUKVLI13	Converged	1.32e+02	9.60e-06	1.12e-06	MaxTime	1.32e+02	4.68e-05	6.60e-07	-1.28e-06	-9.66e-09
LUKVLI14	MaxTime	5.19e+03	1.33e-02	8.68e-06	MaxTime	1.55e+04	1.49e-03	6.29e-02	-1.03e+04	-1.98e+00
LUKVLI15	MaxTime	5.75e+00	1.49e-02	5.85e-04	MaxTime	5.75e+00	1.10e-02	2.45e-04	-1.95e-03	-3.40e-04
LUKVLI16	Converged	4.04e-09	9.87e-06	1.51e-06	Converged	1.16e-07	9.83e-06	9.95e-06	-1.12e-07	-2.76e+01
LUKVLI17	MaxTime	7.81e+02	8.01e-05	7.85e-07	MaxTime	7.81e+02	1.07e-04	3.59e-07	1.30e-04	1.67e-07
LUKVLI18	Converged	1.13e-08	9.77e-06	2.58e-06	Converged	2.26e-07	1.00e-05	1.81e-06	-2.15e-07	-1.90e+01
LUKVLI2	MaxTime	-1.41e+56	6.23e+38	3.55e+01	MaxTime	-4.50e+62	2.57e+23	4.17e+13	4.50e+62	3.19e+06
LUKVLI3	Converged	1.16e+01	8.10e-06	1.17e-07	Converged	1.16e+01	5.19e-06	2.46e-07	-3.76e-07	-3.25e-08
LUKVLI4	NotFinite	3.54e+36	inf	nan	MaxTime	-1.63e+16	2.67e+32	6.78e-01	3.54e+36	1.00e+00
LUKVLI5	Converged	1.21e+01	8.23e-06	5.84e-06	Converged	5.27e-01	9.23e-06	3.76e-06	1.16e+01	9.56e-01
LUKVLI6	MaxTime	6.29e+05	3.00e-03	1.01e-04	MaxTime	6.26e+05	5.37e-03	2.82e-03	2.42e+03	3.85e-03
LUKVLI7	MaxTime	-3.83e+03	5.92e-02	2.28e+00	MaxTime	-4.14e+03	1.51e-01	4.45e+00	3.11e+02	8.12e-02
LUKVLI8	NotFinite	5.71e+06	inf	nan	MaxTime	8.96e+05	2.80e-03	1.27e+00	4.82e+06	8.43e-01
LUKVLI9	MaxTime	9.99e+02	1.90e-04	0.00e+00	MaxTime	9.99e+02	8.66e-05	2.47e-07	-1.28e-07	-1.28e-10
MADSEN	Converged	6.16e-01	7.66e-06	8.18e-07	Converged	6.16e-01	9.91e-07	1.88e-07	2.59e-07	4.20e-07
MADSSCHJ	MaxTime	-4.99e+03	4.11e-03	1.47e-06	Converged	-4.99e+03	4.30e-08	6.61e-09	-1.76e-08	-3.53e-12
MAKELA1	Converged	-1.41e+00	4.16e-06	2.14e-06	Converged	-1.41e+00	1.97e-07	1.39e-06	-4.74e-07	-3.35e-07
MAKELA2	Converged	7.20e+00	2.02e-06	2.82e-08	Converged	7.20e+00	6.84e-06	3.45e-08	-5.48e-08	-7.61e-09
MAKELA3	Converged	2.50e-06	9.89e-06	6.89e-06	Converged	2.50e-06	9.89e-06	6.89e-06	0.00e+00	0.00e+00
MAKELA4	Converged	-3.72e-08	6.80e-06	1.52e-06	Converged	1.00e-07	5.45e-06	4.29e-06	-1.37e-07	-3.69e+00
MANCINONE	Converged	0.00e+00	3.56e-06	3.38e-09	Converged	0.00e+00	9.02e-06	2.70e-09	0.00e+00	nan
MANNE	Converged	-9.75e-01	1.75e-06	8.68e-07	Converged	-9.75e-01	0.00e+00	0.00e+00	0.00e+00	0.00e+00
MARINE	MaxTime	4.43e+09	1.71e+09	1.91e+03	MaxTime	4.31e+09	1.70e+09	9.44e+03	1.23e+08	2.78e-02
MATRIX2	Converged	5.14e-12	7.70e-06	1.29e-10	Converged	9.99e-13	5.86e-06	9.74e-12	4.14e-12	8.06e-01
MCONCON	MaxIter	-6.23e+03	3.18e-01	1.48e-08	MaxIter	-6.23e+03	6.01e+00	1.67e-08	2.40e-02	3.85e-06
MESH	MaxIter	-3.20e+17	5.91e+25	1.79e+10	MaxIter	-4.61e+21	4.29e+09	7.03e-08	4.61e+21	1.44e+04
METHANL8	MaxIter	0.00e+00	6.60e+11	7.25e-03	MaxIter	0.00e+00	9.59e+11	7.42e-03	0.00e+00	nan
MEYER3NE	MaxIter	0.00e+00	2.17e+16	6.35e+01	MaxIter	0.00e+00	1.45e+17	1.87e+01	0.00e+00	nan
MGH09	MaxIter	0.00e+00	1.35e+01	1.26e-01	MaxIter	0.00e+00	7.89e+06	2.49e-02	0.00e+00	nan
MGH09LS	Converged	1.76e-03	4.91e-06	0.00e+00	Converged	9.40e-04	3.69e-06	0.00e+00	8.24e-04	4.67e-01
MGH10	MaxIter	0.00e+00	2.06e+18	2.19e+04	MaxIter	0.00e+00	3.97e+31	1.84e+04	0.00e+00	nan
MGH10LS	MaxIter	1.37e+09	4.05e+03	0.00e+00	MaxIter	1.37e+09	4.05e+03	0.00e+00	6.96e+00	5.09e-09
MGH10S	NotFinite	0.00e+00	inf	nan	MaxIter	0.00e+00	8.56e+20	2.90e+02	0.00e+00	nan
MGH10SLS	NotFinite	4.52e+15	inf	0.00e+00	MaxIter	4.42e+05	2.06e+06	0.00e+00	4.52e+15	1.00e+00
MGH17	NotFinite	0.00e+00	nan	3.12e-01	NotFinite	0.00e+00	nan	3.12e-01	0.00e+00	nan
MGH17LS	Converged	1.02e+00	3.41e-06	0.00e+00	Converged	1.02e+00	6.59e-06	0.00e+00	1.99e-11	1.95e-11
MGH17S	NotFinite	0.00e+00	inf	2.67e-01	MaxIter	0.00e+00	3.80e+07	8.79e-02	0.00e+00	nan
MGH17SLS	Converged	1.02e+00	6.05e-06	0.00e+00	Converged	1.02e+00	9.44e-06	0.00e+00	-4.02e-11	-3.93e-11
MIFFLIN1	Converged	-1.00e+00	6.11e-06	5.31e-07	Converged	-1.00e+00	5.04e-06	4.82e-08	2.23e-07	2.23e-07
MIFFLIN2	Converged	-1.00e+00	5.59e-06	2.17e-07	Converged	-1.00e+00	3.74e-06	1.69e-07	-1.73e-07	-1.73e-07
MINC44	Converged	3.83e-04	8.44e-06	3.42e-06	Converged	3.83e-04	9.11e-06	3.58e-06	-1.38e-08	-3.60e-05
MINMAXBD	Converged	1.16e+02	8.89e-06	4.21e-06	Converged	1.16e+02	9.71e-06	5.99e-06	-3.69e-06	-3.19e-08
MINMAXRB	Converged	9.54e-08	4.71e-06	1.24e-06	Converged	1.80e-08	7.04e-06	7.67e-08	7.75e-08	8.12e-01
MINPERM	Converged	3.63e-04	8.97e-06	2.47e-07	Converged	3.63e-04	4.00e-06	2.02e-07	4.93e-09	1.36e-05
MINSURFO	Converged	2.51e+00	9.98e-06	0.00e+00	Converged	2.51e+00	9.42e-06	0.00e+00	5.76e-09	2.30e-09
MISRA1A	MaxIter	0.00e+00	8.78e+12	1.31e-01	MaxIter	0.00e+00	1.16e+13	1.31e-01	0.00e+00	nan
MISRA1B	MaxIter	0.00e+00	1.74e+13	1.19e-01	MaxIter	0.00e+00	6.91e+12	1.39e-01	0.00e+00	nan
MISRA1C	NotFinite	0.00e+00	nan	1.89e-01	NotFinite	0.00e+00	nan	8.32e-01	0.00e+00	nan
MISRA1D	MaxIter	0.00e+00	1.39e+15	4.24e+00	MaxIter	0.00e+00	7.07e+13	1.66e-01	0.00e+00	nan
MISTAKE	Converged	-1.00e+00	7.49e-06	1.53e-06	Converged	-1.00e+00	7.63e-06	2.87e-06	6.16e-07	6.16e-07
MODEL	MaxIter	0.00e+00	2.09e+09	1.60e-01	MaxIter	0.00e+00	4.47e+07	1.60e-01	0.00e+00	nan
MPC16	MaxTime	-8.85e+06	4.68e+09	5.00e+01	MaxTime	-9.92e+06	2.42e+09	6.40e+01	1.08e+06	1.22e-01
MRIBASIS	Converged	1.82e+01	6.35e-06	5.26e-07	Converged	1.82e+01	4.56e-06	1.25e-06	0.00e+00	0.00e+00
MSQRTA	Converged	0.00e+00	9.67e-06	2.50e-07	MaxTime	0.00e+00	2.42e-05	5.75e-07	0.00e+00	nan

name	status 0	f 0	ε 0	δ 0	status 1	f 1	ε 1	δ 1	imprv	rel imprv
MSQRTB	Converged	0.00e+00	9.28e-06	1.25e-06	Converged	0.00e+00	9.84e-06	1.76e-06	0.00e+00	nan
MSS1	Converged	-9.00e+00	2.74e-06	3.66e-06	Converged	-9.00e+00	4.93e-07	3.66e-06	2.54e-06	2.82e-07
MSS2	Converged	-2.80e+01	8.06e-07	8.13e-06	Converged	-2.70e+01	9.07e-06	1.93e-09	-9.64e-01	-3.45e-02
MSS3	Converged	-4.50e+01	1.41e-06	5.24e-09	Converged	-4.48e+01	2.25e-06	1.85e-06	-1.65e-01	-3.67e-03
MUONSINE	MaxIter	0.00e+00	1.08e+05	2.96e-04	MaxIter	0.00e+00	6.90e+04	2.96e-04	0.00e+00	nan
MWRIGHT	Converged	1.29e+00	5.17e-06	6.09e-07	Converged	1.29e+00	5.17e-06	6.09e-07	0.00e+00	0.00e+00
NASH	MaxIter	0.00e+00	2.82e+08	8.84e+00	MaxIter	0.00e+00	1.56e+08	8.84e+00	0.00e+00	nan
NELSON	MaxIter	0.00e+00	6.63e+18	8.96e-01	NotFinite	0.00e+00	inf	nan	0.00e+00	nan
NGONE	Converged	-6.43e-01	8.61e-06	1.56e-07	Converged	-6.43e-01	9.23e-06	8.80e-08	3.06e-04	4.76e-04
NINE12	MaxTime	7.87e+03	1.49e-04	5.53e-06	MaxTime	7.87e+03	7.75e-04	2.27e-05	-2.99e-04	-3.80e-08
NINE5D	MaxTime	1.01e+04	5.28e-02	2.08e-04	MaxTime	1.01e+04	1.13e-01	8.64e-04	-4.13e+00	-4.11e-04
NINENEW	MaxTime	5.91e+03	3.41e-05	1.74e-06	MaxTime	5.91e+03	1.47e-05	1.16e-06	8.24e-06	1.39e-09
NUFFIELD	MaxTime	-1.85e-02	1.68e+01	6.76e-06	MaxTime	-2.90e-02	2.46e+01	8.33e-06	1.06e-02	5.72e-01
NYSTROM5	Converged	0.00e+00	9.71e-06	1.46e-06	Converged	0.00e+00	8.40e-06	7.77e-07	0.00e+00	nan
ODFITS	Converged	-2.38e+03	9.59e-06	1.92e-06	Converged	-2.38e+03	9.59e-06	1.92e-06	0.00e+00	0.00e+00
ORTHREGB	Converged	1.49e-17	3.66e-06	2.48e-07	Converged	3.22e-14	5.63e-06	1.18e-07	-3.21e-14	-2.15e+03
ORTHREGC	MaxTime	9.48e+01	3.35e-04	8.23e-07	MaxTime	9.48e+01	1.71e-03	6.94e-06	-1.39e-05	-1.46e-07
ORTHRGDM	MaxTime	1.60e+03	2.94e+02	4.35e-04	MaxTime	1.51e+03	7.55e+00	1.28e-05	8.58e+01	5.36e-02
OSBORNE1	MaxIter	0.00e+00	4.62e+07	4.47e-03	MaxIter	0.00e+00	6.31e+09	5.18e-03	0.00e+00	nan
OSBORNE2	NotFinite	0.00e+00	nan	5.96e-02	NotFinite	0.00e+00	nan	1.84e-01	0.00e+00	nan
OSORIO	Converged	2.04e+00	7.79e-06	1.24e-07	Converged	2.04e+00	9.30e-06	2.81e-07	-2.05e-07	-1.01e-07
PENTAGON	Converged	1.37e-04	7.68e-06	1.22e-07	Converged	1.37e-04	7.63e-06	1.31e-07	9.19e-11	6.73e-07
PFIT1	MaxIter	0.00e+00	4.94e+10	1.79e-02	NotFinite	0.00e+00	nan	1.06e-02	0.00e+00	nan
PFIT2	MaxIter	0.00e+00	2.19e+11	9.51e-02	Converged	0.00e+00	9.50e-06	7.47e-10	0.00e+00	nan
PFIT3	MaxIter	0.00e+00	1.81e+16	8.72e+00	NotFinite	0.00e+00	nan	2.10e-01	0.00e+00	nan
PFIT4	MaxIter	0.00e+00	2.01e+18	1.29e+01	NotFinite	0.00e+00	nan	3.74e-01	0.00e+00	nan
POLAK2	MaxIter	5.46e+01	1.20e-04	3.42e-06	Converged	5.46e+01	9.02e-06	8.99e-06	5.46e-03	1.00e-04
POLAK3	Converged	5.93e+00	8.07e-06	1.43e-06	Converged	5.93e+00	6.57e-06	4.17e-06	4.83e-07	8.13e-08
POLAK4	Converged	-1.35e-12	5.67e-06	1.86e-09	Converged	-4.58e-08	4.93e-06	5.62e-08	4.58e-08	3.41e+04
POLAK5	Converged	5.00e+01	3.01e-06	3.12e-06	Converged	5.00e+01	2.74e-06	8.81e-08	3.15e-06	6.30e-08
POLAK6	NotFinite	1.06e+04	inf	2.26e+04	Converged	-4.40e+01	7.82e-07	9.78e-07	1.06e+04	1.00e+00
PORTFL1	Converged	2.05e-02	6.03e-06	3.17e-07	Converged	2.05e-02	7.46e-06	1.99e-07	4.41e-10	2.15e-08
PORTFL2	Converged	2.97e-02	3.13e-06	6.62e-07	Converged	2.97e-02	1.80e-06	2.48e-07	8.35e-09	2.81e-07
PORTFL3	Converged	3.27e-02	9.75e-06	2.23e-07	Converged	3.27e-02	6.33e-06	1.20e-07	2.26e-09	6.91e-08
PORTFL4	Converged	2.63e-02	8.65e-06	1.97e-07	Converged	2.63e-02	1.39e-06	3.45e-07	9.16e-09	3.48e-07
PORTFL6	Converged	2.58e-02	5.70e-06	5.08e-08	Converged	2.58e-02	6.77e-06	7.46e-08	-8.83e-10	-3.42e-08
POWELLBS	Converged	0.00e+00	1.18e-06	1.28e-06	MaxIter	0.00e+00	1.68e+08	1.06e-04	0.00e+00	nan
POWELLSQ	Converged	0.00e+00	1.98e-06	6.42e-08	Converged	0.00e+00	3.23e-06	1.06e-07	0.00e+00	nan
PRICE3NE	Converged	0.00e+00	1.69e-06	1.60e-07	Converged	0.00e+00	1.45e-06	2.05e-07	0.00e+00	nan
PRICE4NE	Converged	0.00e+00	5.52e-07	1.79e-06	Converged	0.00e+00	1.79e-06	7.89e-06	0.00e+00	nan
PRIMAL1	Converged	-3.50e-02	9.58e-06	3.38e-06	Converged	-3.50e-02	9.45e-06	3.50e-06	-9.08e-09	-2.59e-07
PRIMAL2	Converged	-3.37e-02	9.73e-06	2.02e-06	Converged	-3.37e-02	8.09e-06	2.04e-06	8.71e-08	2.58e-06
PRIMAL3	Converged	-1.36e-01	9.05e-06	4.54e-06	Converged	-1.36e-01	9.14e-06	4.64e-06	-1.00e-08	-7.37e-08
PRIMAL4	Converged	-7.46e-01	7.98e-06	3.86e-06	Converged	-7.46e-01	9.80e-06	4.84e-06	4.50e-08	6.04e-08
PRIMALC1	MaxIter	-6.16e+03	4.84e-05	1.98e-06	MaxIter	-6.16e+03	7.96e-05	2.35e-06	1.93e-06	3.13e-10
PRIMALC2	Converged	-3.55e+03	9.17e-06	3.61e-07	Converged	-3.55e+03	6.26e-06	1.43e-06	-9.16e-08	-2.58e-11
PRIMALC5	Converged	-4.27e+02	8.75e-06	1.37e-08	MaxIter	-4.27e+02	3.79e-05	1.82e-07	1.56e-07	3.66e-10
PRIMALC8	MaxIter	-1.83e+04	1.07e-02	4.56e-07	MaxIter	-1.83e+04	1.05e-02	4.39e-07	-2.44e-07	-1.33e-11
PRODPL0	Converged	5.88e+01	9.01e-06	7.08e-07	Converged	5.88e+01	8.74e-06	8.04e-06	2.90e-04	4.93e-06
PRODPL1	Converged	3.57e+01	8.48e-06	1.65e-06	Converged	3.57e+01	9.21e-06	1.49e-06	2.54e-06	7.12e-08
QC	Converged	-9.57e+02	0.00e+00	0.00e+00	Converged	-9.57e+02	0.00e+00	0.00e+00	0.00e+00	0.00e+00
QCNEW	MaxIter	-8.05e+02	5.00e+03	0.00e+00	MaxIter	-8.05e+02	5.00e+03	0.00e+00	0.00e+00	0.00e+00
QPCBLEND	Converged	-7.84e-03	9.28e-06	1.15e-08	Converged	-7.84e-03	7.88e-06	8.63e-09	7.90e-08	1.01e-05
QPCSTAIR	MaxTime	6.20e+06	3.99e-02	2.64e-06	MaxTime	6.20e+06	1.44e-01	4.02e-06	-1.89e-01	-3.05e-08
QPNBLEND	Converged	-8.71e-03	6.85e-06	1.20e-08	Converged	-9.14e-03	7.29e-06	6.84e-10	4.31e-04	4.95e-02
RAT42	MaxIter	0.00e+00	1.37e+10	1.86e+00	MaxIter	0.00e+00	4.38e+11	1.86e+00	0.00e+00	nan
RAT43	NotFinite	0.00e+00	nan	3.56e+02	NotFinite	0.00e+00	nan	nan	0.00e+00	nan
READING7	MaxTime	-2.69e+34	8.54e+23	6.17e+15	MaxTime	-7.41e+41	1.24e+29	1.24e+20	7.41e+41	2.76e+07
RES	Converged	0.00e+00	2.78e-14	6.12e-15	Converged	0.00e+00	2.78e-14	6.12e-15	0.00e+00	nan
RK23	Converged	8.33e-02	5.92e-06	2.97e-06	Converged	8.33e-02	8.74e-06	2.21e-06	1.88e-06	2.25e-05
ROBOT	Converged	6.59e+00	2.06e-06	1.12e-06	Converged	6.59e+00	2.11e-07	1.12e-06	2.89e-08	4.39e-09
ROSENBR	Converged	7.22e-13	5.40e-06	0.00e+00	Converged	8.23e-16	2.12e-07	0.00e+00	7.21e-13	9.99e-01
ROSENMMX	Converged	-4.40e+01	7.38e-07	1.35e-06	Converged	-4.40e+01	1.54e-06	1.08e-06	1.34e-06	3.04e-08
ROTDISC	MaxIter	9.54e+00	1.68e+06	1.05e+00	MaxIter	9.50e+00	2.17e+10	4.96e-01	4.37e-02	4.58e-03
S268	MaxIter	2.91e-11	5.15e-04	0.00e+00	MaxIter	6.49e-06	1.26e-03	0.00e+00	-6.49e-06	-2.23e+05
S365	NotFinite	6.00e+00	inf	nan	NotFinite	6.00e+00	inf	nan	0.00e+00	0.00e+00
S365MOD	NotFinite	6.00e+00	inf	nan	NotFinite	6.00e+00	inf	nan	0.00e+00	0.00e+00

name	status 0	f 0	ε 0	δ 0	status 1	f 1	ε 1	δ 1	imprv	rel imprv
S368	Converged	-7.50e-01	8.62e-06	0.00e+00	Converged	-7.50e-01	8.62e-06	0.00e+00	0.00e+00	0.00e+00
SCOND1LS	NotFinite	8.98e+04	inf	0.00e+00	NotFinite	4.90e+05	inf	0.00e+00	-4.00e+05	-4.46e+00
SMBANK	MaxIter	-7.10e+06	7.99e-01	2.03e-06	MaxIter	-7.10e+06	5.37e-01	2.02e-08	2.97e+03	4.18e-04
SMMPSF	MaxIter	1.47e+06	2.48e+02	1.73e-06	MaxIter	1.35e+06	4.19e+03	2.40e-06	1.27e+05	8.64e-02
SNAKE	Converged	2.00e-02	1.73e-08	1.00e-06	MaxIter	-6.66e+02	1.75e+09	3.33e-02	6.66e+02	3.33e+04
SPANHYD	MaxIter	2.40e+02	5.53e-04	4.33e-07	MaxIter	2.40e+02	5.12e-04	4.44e-07	-2.27e-13	-9.48e-16
STNQP2	MaxTime	-5.75e+05	2.56e-01	1.07e-03	MaxTime	-5.75e+05	1.05e+00	1.02e-01	4.16e+02	7.24e-04
STREG	MaxIter	2.01e+08	5.13e+00	0.00e+00	MaxIter	7.57e+06	1.18e+00	0.00e+00	1.94e+08	9.62e-01
STREGNE	Converged	8.04e-13	5.62e-06	8.22e-07	Converged	5.58e-11	7.47e-06	4.48e-07	-5.50e-11	-6.84e+01
STRTCHDVNE	Converged	0.00e+00	4.62e-06	1.26e-11	Converged	0.00e+00	4.62e-06	1.26e-11	0.00e+00	nan
SUPERSIM	Converged	6.67e-01	7.46e-06	6.38e-07	Converged	6.67e-01	2.65e-07	4.99e-06	4.53e-06	6.80e-06
SWOPF	MaxIter	1.27e-01	4.39e-01	4.30e-07	MaxIter	1.31e-01	7.02e-01	1.24e-07	-4.10e-03	-3.23e-02
SYNTHES1	Converged	7.59e-01	3.18e-07	3.99e-06	Converged	7.59e-01	3.35e-07	3.98e-06	-2.32e-08	-3.06e-08
SYNTHES2	Converged	-5.54e-01	3.17e-06	2.64e-06	Converged	-5.54e-01	3.63e-06	3.22e-06	7.54e-06	1.36e-05
SYNTHES3	Converged	1.51e+01	7.61e-06	1.22e-06	Converged	1.51e+01	7.46e-06	6.30e-08	-2.50e-06	-1.66e-07
TABLE1	MaxIter	7.48e+05	2.04e+01	7.30e-07	MaxIter	7.12e+05	1.27e+01	1.89e-06	3.60e+04	4.82e-02
TRUSPYR1	MaxIter	3.69e+03	5.98e-01	7.75e-12	Converged	1.12e+01	7.16e-06	1.25e-06	3.68e+03	9.97e-01
TRUSPYR2	MaxIter	8.60e+03	2.30e+02	1.65e-10	Converged	1.12e+01	4.59e-06	4.04e-07	8.59e+03	9.99e-01
TRY-B	Converged	1.00e+00	1.71e-07	6.40e-06	Converged	1.00e+00	3.22e-11	1.03e-06	7.43e-06	7.43e-06
TWIRISM1	MaxIter	-1.00e+00	3.42e-02	7.78e-07	MaxIter	-9.95e-01	1.50e-02	4.84e-07	-5.87e-03	-5.87e-03
TWOBARS	Converged	1.51e+00	3.49e-06	7.31e-07	Converged	1.51e+00	3.52e-06	7.40e-07	1.38e-08	9.15e-09
VIBRBEAMNE	MaxIter	0.00e+00	6.30e+31	7.06e+08	MaxIter	0.00e+00	9.49e+12	8.70e-01	0.00e+00	nan
WACHBIEG	Converged	1.00e+00	6.92e-07	3.07e-07	Converged	1.00e+00	7.64e-06	5.90e-07	-4.49e-07	-4.49e-07
WATER	Converged	1.05e+04	9.98e-06	1.24e-06	Converged	1.05e+04	8.73e-06	5.72e-06	-3.19e-04	-3.02e-08
WOMFLET	Converged	1.07e-07	1.41e-08	4.06e-06	Converged	9.80e-09	4.26e-06	1.55e-08	9.75e-08	9.09e-01
YFITNE	Converged	0.00e+00	6.86e-06	6.39e-07	Converged	0.00e+00	9.81e-06	4.39e-07	0.00e+00	nan
YORKNET	MaxIter	1.01e+10	5.85e+26	2.69e+13	MaxTime	2.80e+04	9.78e+08	5.67e+00	1.01e+10	1.00e+00
ZAMB2-10	MaxIter	-1.58e+00	2.25e-03	3.08e-07	MaxIter	-1.58e+00	1.89e-02	1.80e-06	3.08e-03	1.96e-03
ZAMB2-11	MaxIter	-1.08e+00	7.26e-02	1.43e-06	MaxIter	-1.09e+00	1.98e-02	3.99e-07	7.58e-03	6.99e-03
ZAMB2-8	Converged	-1.53e-01	9.77e-06	1.37e-06	Converged	-1.53e-01	9.95e-06	4.14e-07	3.56e-07	2.33e-06
ZAMB2-9	MaxIter	-3.53e-01	2.30e-03	5.27e-07	MaxIter	-3.54e-01	1.76e-03	1.97e-07	9.75e-04	2.76e-03
ZANGWIL3	Converged	0.00e+00	8.03e-06	1.65e-07	Converged	0.00e+00	3.80e-06	9.24e-08	0.00e+00	nan
ZECEVIC2	Converged	-4.13e+00	8.53e-07	1.54e-07	Converged	-4.13e+00	8.29e-07	1.55e-07	1.91e-09	4.63e-10
ZECEVIC3	Converged	9.73e+01	6.05e-06	8.10e-06	Converged	9.73e+01	6.06e-06	8.10e-06	4.22e-08	4.34e-10
ZECEVIC4	Converged	7.56e+00	3.81e-06	2.60e-07	Converged	7.56e+00	3.81e-06	2.60e-07	0.00e+00	0.00e+00
ZIGZAG	MaxTime	8.65e+01	9.21e+00	6.65e-06	MaxTime	8.69e+01	6.50e+00	5.89e-06	-3.60e-01	-4.16e-03
ZY2	Converged	2.00e+00	9.76e-07	1.06e-08	Converged	2.00e+00	8.62e-07	1.78e-08	7.09e-09	3.55e-09

In [12]:
```
worse_f = cmp[(cmp['imprv'] < 0) & (cmp['status 1'] == 'Converged')]
better_f = cmp[(cmp['imprv'] > 0) & (cmp['status 1'] == 'Converged')]
tol = 1e-5
really_worse_f = worse_f[abs(worse_f['rel imprv']) > tol]
really_better_f = better_f[abs(better_f['rel imprv']) > tol]
print(f'{len(worse_f)} tests got worse results')
print(f'{len(really_worse_f)} tests got significantly worse')
print(f'{len(better_f)} tests got better results')
print(f'{len(really_better_f)} tests got significantly better')
print('\nSignificantly worse tests:')
really_worse_f
```

```
101 tests got worse results
24 tests got significantly worse
128 tests got better results
44 tests got significantly better

Significantly worse tests:
```

Out[12]:

name	status 0	f 0	ε 0	δ 0	status 1	f 1	ε 1	δ 1	imprv	rel imprv
BT7	Converged	3.064946e+02	5.731848e-06	2.440385e-06	Converged	3.064991e+02	0.000006	4.638192e-07	-4.515006e-03	-0.000015
C-RELOAD	Converged	-1.016643e+00	9.420258e-06	7.003988e-09	Converged	-1.016152e+00	0.000009	1.152703e-07	-4.907199e-04	-0.000483
GAUSSELM	Converged	-1.000062e+00	9.693862e-06	5.188803e-06	Converged	-1.000040e+00	0.000010	4.763477e-06	-2.184026e-05	-0.000022
HALDMADS	Converged	1.206413e-04	9.160738e-06	8.269145e-06	Converged	1.211392e-04	0.000006	3.008216e-06	-4.979563e-07	-0.004128
HIMMELBG	Converged	1.713217e-14	2.432727e-06	0.000000e+00	Converged	4.162127e-13	0.000007	0.000000e+00	-3.990806e-13	-23.294225
HS111	NotFinite	-6.807185e+01	inf	1.413320e+01	Converged	-4.776110e+01	0.000004	1.217640e-06	-2.031075e+01	-0.298372
HS111LNP	NotFinite	-6.807185e+01	inf	1.413320e+01	Converged	-4.776110e+01	0.000004	1.217640e-06	-2.031075e+01	-0.298372
HS38	Converged	2.469695e-15	6.024903e-07	0.000000e+00	Converged	2.139105e-14	0.000010	0.000000e+00	-1.892135e-14	-7.661413
HS46	Converged	1.969252e-13	8.673468e-06	2.371866e-06	Converged	7.643831e-12	0.000009	2.366683e-06	-7.446906e-12	-37.815907
HS48	Converged	1.927573e-12	7.373367e-06	6.669033e-07	Converged	1.756375e-11	0.000008	6.016194e-09	-1.563617e-11	-8.111847
HS49	Converged	9.152635e-13	7.321455e-06	5.933289e-07	Converged	1.210645e-11	0.000008	3.739024e-07	-1.119119e-11	-12.227284
HS55	Converged	6.333332e+00	8.364586e-06	2.177212e-06	Converged	6.666667e+00	0.000008	1.667988e-06	-3.333347e-01	-0.052632
HS6	Converged	1.287580e-13	2.869376e-07	1.668449e-08	Converged	9.456495e-12	0.000002	1.556293e-08	-9.327737e-12	-72.443949
HS92	Converged	1.361596e+00	1.202598e-06	1.004680e-06	Converged	1.362573e+00	0.000007	7.895208e-08	-9.767620e-04	-0.000717
KISSING2	Converged	5.265492e+00	9.310481e-06	5.116275e-07	Converged	6.216079e+00	0.000010	3.014978e-07	-9.505869e-01	-0.180531
KIWCRESC	Converged	-1.070105e-06	8.126056e-07	1.423598e-06	Converged	-9.354761e-08	0.000003	1.038183e-07	-9.765576e-07	-0.912581
LUKVLI16	Converged	4.039161e-09	9.874117e-06	1.513638e-06	Converged	1.155456e-07	0.000010	9.948563e-06	-1.115065e-07	-27.606344
LUKVLI18	Converged	1.130093e-08	9.773312e-06	2.583109e-06	Converged	2.259756e-07	0.000010	1.805262e-06	-2.146746e-07	-18.996199
MAKELA4	Converged	-3.720255e-08	6.796625e-06	1.516506e-06	Converged	9.998696e-08	0.000005	4.291752e-06	-1.371895e-07	-3.687637
MINC44	Converged	3.828549e-04	8.441532e-06	3.415355e-06	Converged	3.828686e-04	0.000009	3.584022e-06	-1.376626e-08	-0.000036
MSS2	Converged	-2.796390e+01	8.061747e-07	8.133389e-06	Converged	-2.700000e+01	0.000009	1.929988e-09	-9.638969e-01	-0.034469
MSS3	Converged	-4.500047e+01	1.413396e-06	5.241267e-09	Converged	-4.483529e+01	0.000002	1.850236e-06	-1.651788e-01	-0.003671
ORTHREGB	Converged	1.494111e-17	3.658101e-06	2.475044e-07	Converged	3.215014e-14	0.000006	1.179657e-07	-3.213520e-14	-2150.790750
STREGNE	Converged	8.039370e-13	5.617502e-06	8.223786e-07	Converged	5.577836e-11	0.000007	4.480641e-07	-5.497443e-11	-68.381510

In [13]:
```
statusses = base_df[['status']].join(new_df[['status']], lsuffix=' 0', rsuffix=' 1')
not_conv_to_conv = (statusses['status 0'] != 'Converged') & (statusses['status 1'] == 'Converged')
conv_to_not_conv = (statusses['status 0'] == 'Converged') & (statusses['status 1'] != 'Converged')

print(f'{len(base_df[not_conv_to_conv])} tests that didn\'t converge before do converge after the change')
print(f'{len(base_df[conv_to_not_conv])} tests that converged before no longer converge after the change')

display(HTML("<hr>"))

print('The following tests went from not converging to converging')
display(base_df[not_conv_to_conv])
display(new_df[not_conv_to_conv])

display(HTML("<hr>"))

print('The following tests went from converging to no longer converging')
display(base_df[conv_to_not_conv])
display(new_df[conv_to_not_conv])
```

```
17 tests that didn't converge before do converge after the change
15 tests that converged before no longer converge after the change
```

The following tests went from not converging to converging

name	status	time	inner iterations	outer iterations	inner convergence failures	f	ε	δ	f evaluations	grad_f evaluations	g evaluations	grad_g evaluations	linesearch failures	L-BFGS failures	L-BFGS rejected	‖Σ‖	‖x‖	‖y‖
DIXCHLNG	MaxIter	4.186401	198128	200	198	4.274929e+02	6.037180e-05	9.861367e-09	868591	630333	868991	630333	929	0	194111	1.155681e+05	3.170685e+00	6.609778e+02
FLETCHER	MaxIter	0.519757	198053	200	198	3.916521e+11	3.848069e+03	1.948489e-04	657805	522197	658205	522197	102	0	195448	1.732051e+15	1.958489e+11	2.145433e+11
HEART6	MaxIter	0.749780	200000	200	200	0.000000e+00	7.746742e+13	2.484660e-01	451513	424880	451913	424880	61	0	198311	2.000002e+15	9.243138e+02	2.728664e+14
HIMMELP4	NotFinite	0.006182	1003	2	2	-5.173785e+01	inf	0.000000e+00	6685	4280	6690	4280	4	0	835	1.009950e+01	1.117146e+00	7.000000e+02
HS111	NotFinite	0.030507	1118	2	2	-6.807185e+01	inf	1.413320e+01	3334	2743	3339	2743	6	0	856	1.546189e+01	2.099655e+01	3.484931e+01
HS111LNP	NotFinite	0.031240	1118	2	2	-6.807185e+01	inf	1.413320e+01	3334	2743	3339	2743	6	0	856	1.546189e+01	2.099655e+01	3.484931e+01
HS25NE	NotFinite	0.011114	68	3	1	0.000000e+00	NaN	3.676122e-02	439	265	446	265	3	0	0	3.522620e+02	1.027904e+02	1.104119e+00
HS54	MaxIter	0.426629	195084	200	195	-1.559350e-01	7.553099e-05	1.818989e-12	430788	408342	431188	408342	374	0	194408	1.000000e+01	5.015975e+07	7.309451e-05
HS69	MaxIter	0.716477	196660	200	196	-9.567129e+02	1.321473e-04	2.263595e-08	421218	404121	421618	404121	116	0	195350	3.465424e+03	1.448803e+00	5.526732e+01
HS85	MaxTime	90.495024	25356	28	25	-2.183100e+00	1.066035e+00	8.735509e-04	685558	367609	685614	367609	6132	0	15493	2.545673e+05	7.769447e+02	7.280284e-01
HUESTIS	MaxTime	90.451918	18044	27	18	1.741224e+11	7.455878e-02	4.654383e-07	596573	316113	596627	316113	12	0	12952	2.728174e+09	4.172798e+05	6.412614e+08
MADSSCHJ	MaxTime	90.695403	77005	78	77	-4.992134e+03	4.109460e-03	1.473491e-06	205253	178359	205409	178359	45	0	75492	1.407266e+03	5.042370e+03	7.080371e-02
PFIT2	MaxIter	0.532009	197166	200	197	0.000000e+00	2.188930e+11	9.507778e-02	415812	401593	416212	401593	19	0	196816	1.732051e+15	5.159544e+03	1.193375e+14
POLAK2	MaxIter	0.435517	196120	200	196	5.460361e+01	1.203835e-04	3.418319e-06	416554	397902	416954	397902	124	0	192345	1.408843e+02	1.139313e+02	7.071098e-01
POLAK6	NotFinite	0.084765	10008	11	11	1.055962e+04	inf	2.257873e+04	88997	53869	89020	53869	863	0	8807	1.082407e+02	1.573103e+04	2.000000e+09
TRUSPYR1	MaxIter	0.956650	198113	200	198	3.687885e+03	5.982875e-01	7.750994e-12	452272	422329	452672	422329	238	0	180878	9.889866e+09	8.903843e+03	2.136464e-03
TRUSPYR2	MaxIter	2.111199	198150	200	198	8.601531e+03	2.301538e+02	1.649045e-10	662627	528078	663027	528078	326	0	185347	2.677791e+10	2.077591e+04	1.643112e-01

name	status	time	inner iterations	outer iterations	inner convergence failures	f	ε	δ	f evaluations	grad_f evaluations	g evaluations	grad_g evaluations	linesearch failures	L-BFGS failures	L-BFGS rejected	‖Σ‖	‖x‖	‖y‖
DIXCHLNG	Converged	0.006091	450	10	0	8.226970e-08	5.120984e-06	7.102124e-06	1001	937	1021	937	0	0	0	1.616197e+04	3.162278	1.933652e-02
FLETCHER	Converged	0.000356	118	7	0	1.165685e+01	2.968983e-06	8.224130e-07	367	294	381	294	0	0	0	1.140367e+03	5.490186	8.363076e+00
HEART6	Converged	0.008234	1657	6	0	0.000000e+00	5.517395e-06	1.996276e-08	4669	3845	4681	3845	0	0	0	1.370834e+02	20.573945	1.986407e-06
HIMMELP4	Converged	0.000103	6	2	0	-5.901318e+01	0.000000e+00	0.000000e+00	89	27	93	27	0	0	0	1.732051e+00	99.247166	0.000000e+00
HS111	Converged	0.023603	1081	6	0	-4.776110e+01	4.483741e-06	1.217640e-06	2267	2186	2279	2186	0	0	0	1.447045e+02	12.48268	2.226323e+01
HS111LNP	Converged	0.023406	1081	6	0	-4.776110e+01	4.483741e-06	1.217640e-06	2267	2186	2279	2186	0	0	0	1.447045e+02	12.48268	2.226323e+01
HS25NE	Converged	0.008535	105	5	0	0.000000e+00	6.012810e-06	5.876295e-06	296	229	306	229	0	0	0	1.545079e+03	55.919101	4.286998e-01
HS54	Converged	0.223081	65128	71	65	-8.674088e-01	3.805281e-06	2.661665e-06	258493	193291	258635	193291	0	0	64846	1.000000e+01	50159746.522845	4.646783e-05
HS69	Converged	0.007600	2190	8	2	-9.567130e+02	9.010107e-06	2.241775e-06	4718	4470	4734	4470	0	0	1933	1.035024e+04	1.448806	5.526730e+01
HS85	Converged	1.851901	650	7	0	-2.215605e+00	6.849310e-06	1.792847e-06	15679	5457	15693	5457	0	0	0	2.723939e+01	769.699355	6.059620e-02
HUESTIS	Converged	35.469192	7052	17	7	1.741224e+11	9.140215e-06	7.474518e-06	198677	106145	198711	106145	886	0	6358	3.150933e+07	417279.813257	6.412639e+08
MADSSCHJ	Converged	6.021147	6020	8	6	-4.992134e+03	4.298333e-08	6.611117e-09	13249	12411	13265	12411	0	0	5354	1.421197e+02	5042.369836	7.077021e-02
PFIT2	Converged	0.006371	1265	7	0	0.000000e+00	9.497721e-06	7.472867e-10	4938	3627	4952	3627	0	0	0	1.163590e+03	4.123106	7.059405e-07
POLAK2	Converged	0.063532	13684	18	13	5.459814e+01	9.020404e-06	8.985275e-06	53165	39683	53201	39683	4	0	12514	1.412048e+01	54.598141	7.071067e-01
POLAK6	Converged	0.071841	6193	10	6	-4.400000e+01	7.821324e-07	9.783216e-07	15182	12479	15202	12479	0	0	5955	3.716221e+01	44.068129	7.348470e-01
TRUSPYR1	Converged	0.031058	4272	9	2	1.122871e+01	7.161342e-06	1.251182e-06	15751	12079	15769	12079	0	0	1780	1.000056e+03	12.930972	3.356887e+01
TRUSPYR2	Converged	0.786710	84791	88	83	1.122875e+01	4.586946e-06	4.041316e-07	404930	285454	405106	285454	84	0	78260	2.835647e+04	12.933415	4.608709e+01

The following tests went from converging to no longer converging

name	status	time	inner iterations	outer iterations	inner convergence failures	f	ε	δ	f evaluations	grad_f evaluations	g evaluations	grad_g evaluations	linesearch failures	L-BFGS failures	L-BFGS rejected	‖Σ‖	‖x‖	‖y‖
COOLHANSLS	Converged	0.006272	1201	7	1	9.798878e-07	8.271621e-06	0.000000e+00	3269	2814	3283	2814	10	0	777	0.000000e+00	1.775247	0.000000e+00
DUALC8	Converged	1.668640	11183	18	11	1.830936e+04	7.893788e-06	3.984041e-08	41579	31851	41615	31851	10	0	10821	1.000000e+05	0.635296	3.321140e+04
EXPFITC	Converged	1.160439	3445	9	3	2.330257e-02	6.073643e-06	1.782796e-07	19802	13300	19820	13300	9	0	2040	8.891412e+03	14.588723	8.174515e-02
GROUPING	Converged	0.114520	3815	10	1	6.454165e+00	7.952231e-06	4.595133e-06	8694	8154	8714	8154	2	0	900	2.497788e+03	4.472133	3.350068e+01
HIE1327D	Converged	13.281459	40405	42	39	5.189381e+02	8.739009e-06	4.193481e-07	83970	82417	84054	82417	35	0	0	1.224777e+04	1462.953295	1.490291e+00
HIMMELBI	Converged	0.149983	3293	7	2	-1.735570e+03	6.428436e-06	2.281886e-06	8396	7499	8410	7499	1	0	0	6.593030e+01	229.440168	2.837628e-01

name	status	time	inner iterations	outer iterations	inner convergence failures	f	ε	δ	f evaluations	grad_f evaluations	g evaluations	grad_g evaluations	linesearch failures	L-BFGS failures	L-BFGS rejected	‖Σ‖	‖x‖	‖y‖
HS112	Converged	0.004038	327	6	0	-4.776110e+01	4.435028e-06	2.964810e-06	1090	868	1102	868	5	0	0	1.268322e+02	0.940278	2.226322e+01
HS113	Converged	0.679438	60332	66	60	2.430621e+01	9.832530e-06	1.906428e-06	399025	259190	399157	259190	48	0	59584	2.975787e+01	18.797608	2.290198e+00
HS75	Converged	0.094872	13422	20	13	5.174413e+03	4.009255e-06	2.338383e-07	65902	46185	65942	46185	14	0	12618	7.529116e+07	1207.646112	2.779059e+03
LANCZOS1	Converged	0.050237	3014	10	2	0.000000e+00	8.319030e-06	2.629056e-06	7783	6889	7803	6889	16	0	0	2.929273e+03	6.155768	3.482617e-01
LUKVLI13	Converged	13.474210	1511	6	0	1.321855e+02	9.598229e-06	1.116542e-06	4545	3774	4557	3774	1	0	0	3.478595e+02	75.039576	3.225869e+00
MSQRTA	Converged	91.359677	24350	27	23	0.000000e+00	9.666905e-06	2.504182e-07	49888	49327	49942	49327	14	0	0	1.881469e+04	22.681906	5.003778e-04
POWELLBS	Converged	0.004552	2121	9	2	0.000000e+00	1.179581e-06	1.276411e-06	4899	4504	4917	4504	6	0	1993	1.000000e+05	9.094587	2.377794e-09
PRIMALC5	Converged	6.345865	72534	78	72	-4.272326e+02	8.748268e-06	1.369136e-08	318610	231230	318766	231230	3	0	66078	9.831988e+01	460.136503	5.192972e-01
SNAKE	Converged	1.143298	198956	200	198	1.999980e-02	1.727304e-08	9.999900e-07	1481225	939709	1481625	939709	186	0	6	1.414214e+15	0.028284	1.414214e+04

name	status	time	inner iterations	outer iterations	inner convergence failures	f	ε	δ	f evaluations	grad_f evaluations	g evaluations	grad_g evaluations	linesearch failures	L-BFGS failures	L-BFGS rejected	‖Σ‖	‖x‖	‖y‖
COOLHANSLS	MaxIter	0.831902	195171	200	195	0.000030	4.845191e-05	0.000000e+00	397322	390995	397722	390995	1	0	194996	0.000000e+00	1.479257	0.000000e+00
DUALC8	MaxIter	32.326171	196090	200	196	18309.361142	4.957510e-03	2.916182e-09	801228	593937	801628	593937	0	0	195460	1.000000e+05	0.635296	3.321141e+04
EXPFITC	MaxIter	68.033419	194378	200	194	0.023303	2.331579e-05	9.054419e-07	1157660	770878	1158060	770878	0	0	190882	6.770601e+03	14.588323	8.175375e-02
GROUPING	NotFinite	0.076323	2335	6	1	2.506553	inf	2.115577e-02	6100	5345	6113	5345	0	0	1	2.448466e+03	4.468782	2.082531e+01
HIE1327D	MaxIter	64.062934	198781	200	198	518.938514	5.914572e-03	1.222862e-06	400690	399167	401090	399167	0	0	0	5.746047e+04	1462.196612	1.300492e+00
HIMMELBI	NotFinite	0.302787	6278	7	6	-1735.569664	inf	8.675181e-04	16762	14651	16777	14651	0	0	0	4.469830e+02	229.439061	2.836057e-01
HS112	NotFinite	0.000502	20	1	1	-529.415262	NaN	NaN	47	46	50	46	0	0	0	1.560565e+01	9.117253	2.199622e+01
HS113	MaxIter	3.143446	195267	200	195	24.306209	1.244620e-04	4.502346e-07	2149165	1266874	2149565	1266874	0	0	193869	3.840977e+01	18.797608	2.290201e+00
HS75	MaxIter	1.636809	194335	200	194	5174.412608	1.502072e-01	3.187506e-08	1184527	784105	1184927	784105	0	0	189205	7.582984e+07	1207.646097	3.111136e+03
LANCZOS1	MaxIter	3.899305	194386	200	194	0.000000	3.450135e+08	3.081129e-04	634509	506351	634909	506351	0	0	188494	4.898979e+15	8.103914	9.591571e+11
LUKVLI13	MaxTime	109.161063	3224	7	2	132.185469	4.681197e-05	6.595174e-07	59479	32922	59493	32922	0	0	1909	3.478595e+02	75.039576	3.225866e+00
MSQRTA	MaxTime	90.958897	24649	27	24	0.000000	2.421903e-05	5.752680e-07	49435	49384	49489	49384	0	0	0	1.663022e+04	22.681906	6.727104e-04
POWELLBS	MaxIter	0.373871	192112	200	192	0.000000	1.678915e+08	1.063931e-04	565437	470754	565837	470754	0	0	191713	1.000000e+15	14.566459	1.073931e+11
PRIMALC5	MaxIter	31.143359	195526	200	195	-427.232568	3.792153e-05	1.822052e-07	1632574	1008315	1632974	1008315	2	0	172709	9.852406e+01	460.136464	5.192958e-01
SNAKE	MaxIter	4.789693	199014	200	199	-665.694088	1.752792e+09	3.328554e-02	9193590	4076661	9193990	4076661	0	0	0	1.414214e+15	665.694148	4.707309e+13

In [14]:
```
both_converged = (base_df['status'] == 'Converged') & (new_df['status'] == 'Converged')
cmp = compare_results(base_df[both_converged], new_df[both_converged], ['status', 'time', 'f evaluations', 'grad_f evaluations'])
cmp['time imprv'] = cmp['time 0'] - cmp['time 1']
cmp['rel time imprv'] = cmp['time imprv'] / cmp['time 0']
cmp['f eval imprv'] = cmp['f evaluations 0'] - cmp['f evaluations 1']
cmp['rel f eval imprv'] = cmp['f eval imprv'] / cmp['f evaluations 0']
cmp['grad_f eval imprv'] = cmp['grad_f evaluations 0'] - cmp['grad_f evaluations 1']
cmp['rel grad_f eval imprv'] = cmp['grad_f eval imprv'] / cmp['grad_f evaluations 0']
print(f"Net time improvement:      {cmp['time imprv'].sum()}")
print(f"Relative time improvement: {100 * cmp['time imprv'].sum() / cmp['time 0'].sum():.02f}%")
print(f"Net f eval improvement:      {cmp['f eval imprv'].sum()}")
print(f"Relative f eval improvement: {100 * cmp['f eval imprv'].sum() / cmp['f evaluations 0'].sum():.02f}%")
print(f"Net grad_f eval improvement:      {cmp['grad_f eval imprv'].sum()}")
print(f"Relative grad_f eval improvement: {100 * cmp['grad_f eval imprv'].sum() / cmp['grad_f evaluations 0'].sum():.02f}%")
print('positive is good, negative is bad')

cmp.style.applymap(color_negative_red_positive_green, subset=['time imprv', 'rel time imprv', 'f eval imprv', 'rel f eval imprv', 'grad_f eval imprv', 'rel grad_f eval imprv']) \
         .format('{:.2e}', subset=(cmp.dtypes == float))
```

```
Net time improvement:      197.700445
Relative time improvement: 30.60%
Net f eval improvement:      1485490
Relative f eval improvement: 23.24%
Net grad_f eval improvement:      1212015
Relative grad_f eval improvement: 26.11%
positive is good, negative is bad
```

Out[14]:

name	status 0	time 0	f evaluations 0	grad_f evaluations 0	status 1	time 1	f evaluations 1	grad_f evaluations 1	time imprv	rel time imprv	f eval imprv	rel f eval imprv	grad_f eval imprv	rel grad_f eval imprv
3PK	Converged	6.20e-01	188892	183547	Converged	5.31e-01	156057	155356	8.93e-02	1.44e-01	32835	1.74e-01	28191	1.54e-01
A5NSDSDM	Converged	8.42e+00	14715	14534	Converged	1.88e+01	18661	18624	-1.04e+01	-1.23e+00	-3946	-2.68e-01	-4090	-2.81e-01
A5NSSNSM	Converged	8.93e+00	14715	14534	Converged	9.58e+00	18661	18624	-6.53e-01	-7.31e-02	-3946	-2.68e-01	-4090	-2.81e-01
AIRCRFTA	Converged	8.16e-04	838	586	Converged	4.84e-04	348	330	3.32e-04	4.07e-01	490	5.85e-01	256	4.37e-01
ALLINITA	Converged	1.14e-01	57594	34905	Converged	8.90e-02	52913	29561	2.55e-02	2.23e-01	4681	8.13e-02	5344	1.53e-01
ALLINITC	Converged	5.08e-01	280252	176974	Converged	2.04e-01	95366	62588	3.04e-01	5.98e-01	184886	6.60e-01	114386	6.46e-01
ALSOTAME	Converged	1.24e-04	87	68	Converged	1.08e-04	87	68	1.60e-05	1.29e-01	0	0.00e+00	0	0.00e+00
AVGASA	Converged	4.91e-04	248	242	Converged	4.87e-04	248	242	4.00e-06	8.15e-03	0	0.00e+00	0	0.00e+00
AVGASB	Converged	7.68e-04	440	352	Converged	5.83e-04	302	290	1.85e-04	2.41e-01	138	3.14e-01	62	1.76e-01
BA-L1	Converged	1.51e-02	682	398	Converged	6.65e-03	263	208	8.41e-03	5.59e-01	419	6.14e-01	190	4.77e-01
BA-L1SP	Converged	5.48e-02	726	486	Converged	1.93e-02	201	194	3.55e-02	6.47e-01	525	7.23e-01	292	6.01e-01
BEALENE	Converged	6.16e-04	620	371	Converged	2.26e-04	132	117	3.90e-04	6.33e-01	488	7.87e-01	254	6.85e-01
BIGGSC4	Converged	9.46e-04	1153	717	Converged	7.56e-04	912	584	1.90e-04	2.01e-01	241	2.09e-01	133	1.85e-01
BOOTH	Converged	1.48e-04	205	128	Converged	9.00e-05	40	41	5.80e-05	3.92e-01	165	8.05e-01	87	6.80e-01
BOX3NE	Converged	8.47e-04	402	267	Converged	3.85e-04	146	128	4.62e-04	5.45e-01	256	6.37e-01	139	5.21e-01
BRITGAS	Converged	4.22e-01	5163	4910	Converged	6.20e-01	6597	6543	-1.97e-01	-4.67e-01	-1434	-2.78e-01	-1633	-3.33e-01
BROWNBSNE	Converged	2.38e-04	462	183	Converged	1.24e-04	237	50	1.14e-04	4.79e-01	225	4.87e-01	133	7.27e-01
BT1	Converged	2.37e-04	423	236	Converged	1.15e-04	84	67	1.22e-04	5.15e-01	339	8.01e-01	169	7.16e-01
BT10	Converged	2.01e-04	245	200	Converged	1.82e-04	167	161	1.90e-05	9.45e-02	78	3.18e-01	39	1.95e-01
BT11	Converged	5.49e-04	486	407	Converged	3.68e-04	306	305	1.81e-04	3.30e-01	180	3.70e-01	102	2.51e-01
BT12	Converged	9.19e-04	1148	798	Converged	4.76e-04	408	378	4.43e-04	4.82e-01	740	6.45e-01	420	5.26e-01
BT13	Converged	3.34e-03	3999	3038	Converged	6.07e-03	8345	5890	-2.73e-03	-8.19e-01	-4346	-1.09e+00	-2852	-9.39e-01
BT2	Converged	2.91e-03	3766	2420	Converged	5.03e-04	451	396	2.41e-03	8.27e-01	3315	8.80e-01	2024	8.36e-01
BT3	Converged	5.05e-04	618	415	Converged	2.51e-04	206	198	2.54e-04	5.03e-01	412	6.67e-01	217	5.23e-01
BT4	Converged	4.63e-04	640	430	Converged	2.82e-04	250	230	1.81e-04	3.91e-01	390	6.09e-01	200	4.65e-01
BT5	Converged	1.84e-02	6612	6339	Converged	2.09e-02	25982	17062	-2.48e-03	-1.35e-01	-19370	-2.93e+00	-10723	-1.69e+00
BT6	Converged	1.52e-03	812	617	Converged	8.30e-04	346	345	6.90e-04	4.54e-01	466	5.74e-01	272	4.41e-01
BT7	Converged	6.21e-03	5676	5238	Converged	5.82e-03	4761	4622	3.85e-04	6.20e-02	915	1.61e-01	616	1.18e-01
BT8	Converged	2.39e-04	278	202	Converged	1.74e-04	140	140	6.50e-05	2.72e-01	138	4.96e-01	62	3.07e-01
BT9	Converged	2.62e-04	309	264	Converged	2.28e-04	233	227	3.40e-05	1.30e-01	76	2.46e-01	37	1.40e-01
BYRDSPHR	Converged	4.43e-04	608	392	Converged	3.05e-04	384	283	1.38e-04	3.12e-01	224	3.68e-01	109	2.78e-01
C-RELOAD	Converged	8.18e+00	84588	81408	Converged	4.47e+00	41835	40857	3.71e+00	4.54e-01	42753	5.05e-01	40551	4.98e-01
CANTILVR	Converged	2.24e-04	290	197	Converged	2.44e-04	210	156	-2.00e-05	-8.93e-02	80	2.76e-01	41	2.08e-01
CHACONN1	Converged	3.33e-04	370	253	Converged	1.88e-04	122	122	1.45e-04	4.35e-01	248	6.70e-01	131	5.18e-01
CHACONN2	Converged	3.71e-04	394	279	Converged	2.06e-04	148	150	1.65e-04	4.45e-01	246	6.24e-01	129	4.62e-01
CLUSTER	Converged	2.68e-04	203	160	Converged	1.96e-04	165	113	7.20e-05	2.69e-01	38	1.87e-01	47	2.94e-01
CONGIGMZ	Converged	5.96e-04	649	508	Converged	4.69e-04	523	388	1.27e-04	2.13e-01	126	1.94e-01	120	2.36e-01
CUBENE	Converged	5.22e-04	1027	616	Converged	1.39e-04	174	156	3.83e-04	7.34e-01	853	8.31e-01	460	7.47e-01
DECONVBNE	Converged	1.55e-01	10490	9528	Converged	1.48e-01	9018	8472	6.99e-03	4.49e-02	1472	1.40e-01	1056	1.11e-01
DECONVC	Converged	5.02e-02	1794	1659	Converged	5.49e-02	1904	1781	-4.70e-03	-9.36e-02	-110	-6.13e-02	-122	-7.35e-02
DECONVNE	Converged	7.31e-02	4297	4303	Converged	7.50e-02	4297	4303	-1.88e-03	-2.56e-02	0	0.00e+00	0	0.00e+00
DECONVU	Converged	4.14e-03	275	239	Converged	3.33e-03	199	202	8.12e-04	1.96e-01	76	2.76e-01	37	1.55e-01
DEMYMALO	Converged	4.18e-04	607	393	Converged	1.90e-04	238	171	2.28e-04	5.45e-01	369	6.08e-01	222	5.65e-01
DIPIGRI	Converged	3.62e-01	289754	258005	Converged	1.36e-01	131179	84529	2.26e-01	6.24e-01	158575	5.47e-01	173476	6.72e-01
DISC2	Converged	7.63e-03	2391	2216	Converged	9.99e-03	2341	2322	-2.35e-03	-3.08e-01	50	2.09e-02	-106	-4.78e-02
DISCS	Converged	1.58e-01	14074	13567	Converged	3.84e-01	37771	32777	-2.26e-01	-1.43e+00	-23697	-1.68e+00	-19210	-1.42e+00
DUAL1	Converged	2.17e-01	767	720	Converged	9.43e-02	613	607	1.23e-01	5.66e-01	154	2.01e-01	113	1.57e-01
DUAL2	Converged	6.95e-02	407	371	Converged	6.82e-02	376	377	1.25e-03	1.80e-02	31	7.62e-02	-6	-1.62e-02
DUAL3	Converged	9.34e-02	439	362	Converged	9.44e-02	402	404	-9.22e-04	-9.87e-03	37	8.43e-02	-42	-1.16e-01

name	status 0	time 0	f evaluations 0	grad_f evaluations 0	status 1	time 1	f evaluations 1	grad_f evaluations 1	time imprv	rel time imprv	f eval imprv	rel f eval imprv	grad_f eval imprv	rel grad_f eval imprv
DUAL4	Converged	1.96e-02	196	159	Converged	4.72e-02	118	120	-2.77e-02	-1.41e+00	78	3.98e-01	39	2.45e-01
DUALC1	Converged	1.43e-01	6705	6473	Converged	5.19e-02	2433	2323	9.07e-02	6.36e-01	4272	6.37e-01	4150	6.41e-01
DUALC2	Converged	9.01e-02	4323	4234	Converged	1.35e-01	6428	6230	-4.50e-02	-5.00e-01	-2105	-4.87e-01	-1996	-4.71e-01
DUALC5	Converged	1.46e+00	68126	40069	Converged	5.75e-02	2232	2189	1.40e+00	9.61e-01	65894	9.67e-01	37880	9.45e-01
EG2	Converged	3.57e-03	29	24	Converged	3.62e-03	29	24	-4.50e-05	-1.26e-02	0	0.00e+00	0	0.00e+00
EQC	Converged	9.24e-02	37934	19972	Converged	9.24e-02	37934	19972	3.40e-05	3.68e-04	0	0.00e+00	0	0.00e+00
EXPFITA	Converged	7.06e-03	1999	1490	Converged	5.06e-03	1403	1138	2.00e-03	2.83e-01	596	2.98e-01	352	2.36e-01
EXPFITB	Converged	2.53e-02	1743	1448	Converged	1.96e-02	1327	1212	5.65e-03	2.24e-01	416	2.39e-01	236	1.63e-01
EXTROSNBNE	Converged	9.25e-01	9868	9391	Converged	1.06e+00	10714	10650	-1.33e-01	-1.44e-01	-846	-8.57e-02	-1259	-1.34e-01
FCCU	Converged	1.36e-03	574	471	Converged	1.19e-03	420	395	1.71e-04	1.26e-01	154	2.68e-01	76	1.61e-01
FEEDLOC	Converged	3.24e-01	10234	9017	Converged	2.90e-01	9332	8560	3.37e-02	1.04e-01	902	8.81e-02	457	5.07e-02
FERRISDC	Converged	3.98e-02	3	3	Converged	3.73e-02	3	3	2.51e-03	6.30e-02	0	0.00e+00	0	0.00e+00
GAUSSELM	Converged	6.86e+01	8104	7913	Converged	9.17e+01	8250	8177	-2.30e+01	-3.36e-01	-146	-1.80e-02	-264	-3.34e-02
GIGOMEZ1	Converged	4.20e-04	692	427	Converged	2.23e-04	223	185	1.97e-04	4.69e-01	469	6.78e-01	242	5.67e-01
GIGOMEZ2	Converged	2.33e-04	149	148	Converged	1.96e-04	149	148	3.70e-05	1.59e-01	0	0.00e+00	0	0.00e+00
GIGOMEZ3	Converged	3.22e-04	338	254	Converged	2.18e-04	172	162	1.04e-04	3.23e-01	166	4.91e-01	92	3.62e-01
GILBERT	Converged	2.60e-01	624	453	Converged	2.97e-01	725	439	-3.69e-02	-1.42e-01	-101	-1.62e-01	14	3.09e-02
GMNCASE1	Converged	2.13e+00	3107	2905	Converged	1.81e+00	2753	2746	3.24e-01	1.52e-01	354	1.14e-01	159	5.47e-02
GMNCASE2	Converged	7.09e+00	8392	8191	Converged	6.61e+00	7854	7848	4.78e-01	6.75e-02	538	6.41e-02	343	4.19e-02
GMNCASE3	Converged	6.07e+00	6928	6837	Converged	4.94e+00	7072	7059	1.12e+00	1.85e-01	-144	-2.08e-02	-222	-3.25e-02
GOFFIN	Converged	2.33e-02	1460	1185	Converged	2.35e-02	1384	1148	-1.18e-04	-5.06e-03	76	5.21e-02	37	3.12e-02
GOULDQP1	Converged	2.68e-01	151343	86451	Converged	3.47e-01	197719	109645	-7.91e-02	-2.95e-01	-46376	-3.06e-01	-23194	-2.68e-01
GOULDQP2	Converged	3.44e-02	33	3	Converged	4.98e-02	33	3	-1.54e-02	-4.46e-01	0	0.00e+00	0	0.00e+00
GOULDQP3	Converged	4.22e+00	983	788	Converged	2.11e+00	703	664	2.11e+00	5.00e-01	280	2.85e-01	124	1.57e-01
HAIFAS	Converged	4.79e-04	323	211	Converged	4.07e-04	247	170	7.20e-05	1.50e-01	76	2.35e-01	41	1.94e-01
HALDMADS	Converged	2.22e-02	5119	4399	Converged	8.04e-03	1649	1552	1.41e-02	6.37e-01	3470	6.78e-01	2847	6.47e-01
HARKERP2	Converged	1.22e+01	3442	2517	Converged	1.31e+01	3872	2813	-9.34e-01	-7.66e-02	-430	-1.25e-01	-296	-1.18e-01
HATFLDF	Converged	1.45e-03	2169	1294	Converged	1.22e-03	1792	1090	2.25e-04	1.55e-01	377	1.74e-01	204	1.58e-01
HATFLDG	Converged	2.69e-03	764	719	Converged	3.21e-03	678	672	-5.14e-04	-1.91e-01	86	1.13e-01	47	6.54e-02
HATFLDH	Converged	4.97e-04	536	367	Converged	2.58e-04	234	214	2.39e-04	4.81e-01	302	5.63e-01	153	4.17e-01
HELIXNE	Converged	2.82e-04	252	208	Converged	2.11e-04	154	149	7.10e-05	2.52e-01	98	3.89e-01	59	2.84e-01
HET-Z	Converged	6.21e-03	71	77	Converged	6.08e-03	71	77	1.27e-04	2.04e-02	0	0.00e+00	0	0.00e+00
HIE1372D	Converged	8.14e+01	1724784	972028	Converged	4.76e+00	68902	68754	7.67e+01	9.42e-01	1655882	9.60e-01	903274	9.29e-01
HILBERTA	Converged	6.00e-05	29	30	Converged	4.20e-05	29	30	1.80e-05	3.00e-01	0	0.00e+00	0	0.00e+00
HILBERTB	Converged	1.30e-04	21	26	Converged	1.22e-04	21	26	8.00e-06	6.15e-02	0	0.00e+00	0	0.00e+00
HIMMELBA	Converged	1.35e-04	213	136	Converged	1.79e-04	57	58	-4.40e-05	-3.26e-01	156	7.32e-01	78	5.74e-01
HIMMELBB	Converged	8.00e-05	90	74	Converged	1.08e-04	90	74	-2.80e-05	-3.50e-01	0	0.00e+00	0	0.00e+00
HIMMELBC	Converged	1.41e-04	218	140	Converged	6.40e-05	39	39	7.70e-05	5.46e-01	179	8.21e-01	101	7.21e-01
HIMMELBCLS	Converged	6.80e-05	103	65	Converged	4.60e-05	29	31	2.20e-05	3.24e-01	74	7.18e-01	34	5.23e-01
HIMMELBE	Converged	2.56e-04	337	221	Converged	1.13e-04	81	82	1.43e-04	5.59e-01	256	7.60e-01	139	6.29e-01
HIMMELBG	Converged	6.80e-05	102	64	Converged	9.20e-05	32	30	-2.40e-05	-3.53e-01	70	6.86e-01	34	5.31e-01
HIMMELBH	Converged	9.40e-05	118	79	Converged	7.90e-05	32	33	1.50e-05	1.60e-01	86	7.29e-01	46	5.82e-01
HIMMELBK	Converged	4.05e-02	4787	3879	Converged	3.68e-02	3567	3073	3.74e-03	9.24e-02	1220	2.55e-01	806	2.08e-01
HIMMELP1	Converged	1.18e-03	3647	1985	Converged	8.20e-05	120	57	1.10e-03	9.31e-01	3527	9.67e-01	1928	9.71e-01
HIMMELP2	Converged	1.02e-02	16539	8753	Converged	1.45e-04	199	57	1.00e-02	9.86e-01	16340	9.88e-01	8696	9.93e-01
HIMMELP3	Converged	2.91e-03	4316	2291	Converged	9.40e-05	89	27	2.82e-03	9.68e-01	4227	9.79e-01	2264	9.88e-01
HIMMELP5	Converged	1.39e-04	104	59	Converged	8.70e-05	39	25	5.20e-05	3.74e-01	65	6.25e-01	34	5.76e-01
HIMMELP6	Converged	1.34e-04	104	59	Converged	8.40e-05	39	25	5.00e-05	3.73e-01	65	6.25e-01	34	5.76e-01
HONG	Converged	3.88e-04	351	266	Converged	2.76e-04	200	190	1.12e-04	2.89e-01	151	4.30e-01	76	2.86e-01
HS10	Converged	2.53e-04	350	216	Converged	1.35e-04	169	113	1.18e-04	4.66e-01	181	5.17e-01	103	4.77e-01
HS100	Converged	4.14e-01	300508	293146	Converged	1.16e-01	83466	50988	2.98e-01	7.19e-01	217042	7.22e-01	242158	8.26e-01
HS100LNP	Converged	1.33e-03	920	795	Converged	5.52e-03	4159	3385	-4.19e-03	-3.14e+00	-3239	-3.52e+00	-2590	-3.26e+00
HS100MOD	Converged	2.07e-02	14956	13638	Converged	6.82e-02	29957	18186	-4.76e-02	-2.30e+00	-15001	-1.00e+00	-4548	-3.33e-01
HS105	Converged	1.36e-01	1128	879	Converged	1.53e-01	1292	951	-1.67e-02	-1.23e-01	-164	-1.45e-01	-72	-8.19e-02
HS107	Converged	8.14e-01	305521	241881	Converged	3.12e+00	1284261	832465	-2.31e+00	-2.83e+00	-978740	-3.20e+00	-590584	-2.44e+00
HS108	Converged	9.19e-04	408	355	Converged	7.93e-04	331	317	1.26e-04	1.37e-01	77	1.89e-01	38	1.07e-01
HS11	Converged	1.14e-04	98	96	Converged	1.21e-04	98	96	-7.00e-06	-6.14e-02	0	0.00e+00	0	0.00e+00
HS110	Converged	9.80e-05	21	20	Converged	1.02e-04	21	20	-4.00e-06	-4.08e-02	0	0.00e+00	0	0.00e+00
HS118	Converged	2.38e-03	978	774	Converged	1.70e-03	691	638	6.79e-04	2.85e-01	287	2.93e-01	136	1.76e-01
HS119	Converged	1.46e-01	9748	9087	Converged	3.98e-01	33684	21017	-2.52e-01	-1.73e+00	-23936	-2.46e+00	-11930	-1.31e+00
HS12	Converged	2.52e-04	355	229	Converged	1.27e-04	103	90	1.25e-04	4.96e-01	252	7.10e-01	139	6.07e-01
HS13	Converged	2.15e-04	217	184	Converged	1.43e-04	139	145	7.20e-05	3.35e-01	78	3.59e-01	39	2.12e-01
HS14	Converged	3.21e-04	498	303	Converged	1.78e-04	99	97	1.43e-04	4.45e-01	399	8.01e-01	206	6.80e-01
HS15	Converged	4.28e-04	591	376	Converged	4.24e-04	591	376	4.00e-06	9.35e-03	0	0.00e+00	0	0.00e+00
HS16	Converged	5.46e-04	881	509	Converged	1.22e-04	100	87	4.24e-04	7.77e-01	781	8.86e-01	422	8.29e-01
HS17	Converged	2.08e-04	261	178	Converged	1.28e-04	103	98	8.00e-05	3.85e-01	158	6.05e-01	80	4.49e-01
HS18	Converged	3.54e-04	491	308	Converged	1.47e-04	136	122	2.07e-04	5.85e-01	355	7.23e-01	186	6.04e-01

name	status 0	time 0	f evaluations 0	grad_f evaluations 0	status 1	time 1	f evaluations 1	grad_f evaluations 1	time imprv	rel time imprv	f eval imprv	rel f eval imprv	grad_f eval imprv	rel grad_f eval imprv
HS19	Converged	9.13e-02	103574	101400	Converged	4.20e-02	54006	41845	4.94e-02	5.40e-01	49568	4.79e-01	59555	5.87e-01
HS2	Converged	7.90e-05	76	65	Converged	6.50e-05	76	65	1.40e-05	1.77e-01	0	0.00e+00	0	0.00e+00
HS20	Converged	3.15e-04	315	210	Converged	1.83e-04	157	132	1.32e-04	4.19e-01	158	5.02e-01	78	3.71e-01
HS21	Converged	5.30e-05	27	15	Converged	8.00e-05	27	15	-2.70e-05	-5.09e-01	0	0.00e+00	0	0.00e+00
HS21MOD	Converged	6.90e-05	17	18	Converged	5.70e-05	17	18	1.20e-05	1.74e-01	0	0.00e+00	0	0.00e+00
HS22	Converged	3.98e-04	668	390	Converged	1.46e-04	110	105	2.52e-04	6.33e-01	558	8.35e-01	285	7.31e-01
HS23	Converged	4.59e-04	617	366	Converged	1.85e-04	153	122	2.74e-04	5.97e-01	464	7.52e-01	244	6.67e-01
HS24	Converged	1.65e-04	221	117	Converged	1.46e-04	158	122	1.90e-05	1.15e-01	63	2.85e-01	-5	-4.27e-02
HS25	Converged	1.62e-02	959	547	Converged	2.85e-02	846	483	-1.23e-02	-7.58e-01	113	1.18e-01	64	1.17e-01
HS26	Converged	4.79e-04	612	441	Converged	2.29e-04	196	196	2.50e-04	5.22e-01	416	6.80e-01	245	5.56e-01
HS27	Converged	3.70e-04	444	351	Converged	1.55e-04	156	148	2.15e-04	5.81e-01	288	6.49e-01	203	5.78e-01
HS28	Converged	2.21e-04	280	202	Converged	1.59e-04	134	134	6.20e-05	2.81e-01	146	5.21e-01	68	3.37e-01
HS29	Converged	3.42e-04	494	332	Converged	2.25e-04	193	175	1.17e-04	3.42e-01	301	6.09e-01	157	4.73e-01
HS3	Converged	4.50e-05	10	15	Converged	4.10e-05	10	15	4.00e-06	8.89e-02	0	0.00e+00	0	0.00e+00
HS30	Converged	4.20e-05	7	7	Converged	4.50e-05	7	7	-3.00e-06	-7.14e-02	0	0.00e+00	0	0.00e+00
HS31	Converged	3.54e-04	249	168	Converged	1.22e-04	104	100	2.32e-04	6.55e-01	145	5.82e-01	68	4.05e-01
HS32	Converged	2.31e-04	229	181	Converged	1.90e-04	143	136	4.10e-05	1.77e-01	86	3.76e-01	45	2.49e-01
HS33	Converged	1.11e-04	64	26	Converged	9.30e-05	64	26	1.80e-05	1.62e-01	0	0.00e+00	0	0.00e+00
HS34	Converged	5.48e-04	796	437	Converged	2.81e-04	355	214	2.67e-04	4.87e-01	441	5.54e-01	223	5.10e-01
HS35	Converged	1.79e-04	176	137	Converged	1.30e-04	98	98	4.90e-05	2.74e-01	78	4.43e-01	39	2.85e-01
HS35I	Converged	1.61e-04	176	137	Converged	1.33e-04	98	98	2.80e-05	1.74e-01	78	4.43e-01	39	2.85e-01
HS35MOD	Converged	1.41e-04	142	100	Converged	9.90e-05	76	69	4.20e-05	2.98e-01	66	4.65e-01	31	3.10e-01
HS36	Converged	9.60e-05	71	68	Converged	9.70e-05	71	68	-1.00e-06	-1.04e-02	0	0.00e+00	0	0.00e+00
HS37	Converged	2.17e-04	284	196	Converged	1.75e-04	131	118	4.20e-05	1.94e-01	153	5.39e-01	78	3.98e-01
HS38	Converged	2.58e-04	410	288	Converged	1.26e-04	122	119	1.32e-04	5.12e-01	288	7.02e-01	169	5.87e-01
HS39	Converged	3.07e-04	309	264	Converged	2.84e-04	233	227	2.30e-05	7.49e-02	76	2.46e-01	37	1.40e-01
HS3MOD	Converged	7.60e-05	112	73	Converged	4.70e-05	34	34	2.90e-05	3.82e-01	78	6.96e-01	39	5.34e-01
HS4	Converged	3.00e-05	4	5	Converged	3.70e-05	4	5	-7.00e-06	-2.33e-01	0	0.00e+00	0	0.00e+00
HS40	Converged	2.51e-04	245	206	Converged	2.06e-04	159	159	4.50e-05	1.79e-01	86	3.51e-01	47	2.28e-01
HS41	Converged	1.52e-04	210	133	Converged	1.23e-04	120	82	2.90e-05	1.91e-01	90	4.29e-01	51	3.83e-01
HS42	Converged	2.54e-04	293	214	Converged	1.79e-04	139	138	7.50e-05	2.95e-01	154	5.26e-01	76	3.55e-01
HS43	Converged	5.04e-04	468	347	Converged	2.94e-04	221	216	2.10e-04	4.17e-01	247	5.28e-01	131	3.78e-01
HS44	Converged	3.70e-04	461	247	Converged	2.05e-04	191	105	1.65e-04	4.46e-01	270	5.86e-01	142	5.75e-01
HS44NEW	Converged	4.25e-04	545	290	Converged	2.87e-04	155	95	1.38e-04	3.25e-01	390	7.16e-01	195	6.72e-01
HS45	Converged	4.20e-05	30	26	Converged	4.40e-05	30	26	-2.00e-06	-4.76e-02	0	0.00e+00	0	0.00e+00
HS46	Converged	6.29e-04	485	445	Converged	6.07e-04	353	352	2.20e-05	3.50e-02	132	2.72e-01	93	2.09e-01
HS47	Converged	2.58e-04	158	155	Converged	2.37e-04	158	155	2.10e-05	8.14e-02	0	0.00e+00	0	0.00e+00
HS48	Converged	2.79e-04	365	249	Converged	1.70e-04	138	140	1.09e-04	3.91e-01	227	6.22e-01	109	4.38e-01
HS49	Converged	3.93e-04	414	374	Converged	3.71e-04	302	302	2.20e-05	5.60e-02	112	2.71e-01	72	1.93e-01
HS5	Converged	9.40e-05	86	34	Converged	8.30e-05	86	34	1.10e-05	1.17e-01	0	0.00e+00	0	0.00e+00
HS50	Converged	4.57e-04	426	348	Converged	2.74e-04	215	216	1.83e-04	4.00e-01	211	4.95e-01	132	3.79e-01
HS51	Converged	2.59e-04	269	227	Converged	2.74e-04	223	218	-1.50e-05	-5.79e-02	46	1.71e-01	9	3.96e-02
HS52	Converged	9.33e-04	1162	757	Converged	4.06e-04	313	299	5.27e-04	5.65e-01	849	7.31e-01	458	6.05e-01
HS53	Converged	4.88e-04	616	414	Converged	2.57e-04	213	205	2.31e-04	4.73e-01	403	6.54e-01	209	5.05e-01
HS55	Converged	1.08e-03	1110	746	Converged	8.33e-04	630	482	2.48e-04	2.29e-01	480	4.32e-01	264	3.54e-01
HS56	Converged	1.79e-03	1542	991	Converged	3.66e-04	202	193	1.43e-03	7.96e-01	1340	8.69e-01	798	8.05e-01
HS57	Converged	2.71e-04	44	26	Converged	2.75e-04	44	26	-4.00e-06	-1.48e-02	0	0.00e+00	0	0.00e+00
HS59	Converged	4.33e-04	48	48	Converged	4.24e-04	48	48	9.00e-06	2.08e-02	0	0.00e+00	0	0.00e+00
HS6	Converged	6.52e-04	1277	779	Converged	2.73e-04	437	307	3.79e-04	5.81e-01	840	6.58e-01	472	6.06e-01
HS60	Converged	3.03e-04	327	249	Converged	2.00e-04	153	153	1.03e-04	3.40e-01	174	5.32e-01	96	3.86e-01
HS61	Converged	1.84e-04	199	153	Converged	1.49e-04	130	116	3.50e-05	1.90e-01	69	3.47e-01	37	2.42e-01
HS62	Converged	1.88e-02	13130	12596	Converged	8.45e-02	78204	43110	-6.57e-02	-3.49e+00	-65074	-4.96e+00	-30514	-2.42e+00
HS63	Converged	1.85e-04	191	157	Converged	1.90e-04	126	124	-5.00e-06	-2.70e-02	65	3.40e-01	33	2.10e-01
HS64	Converged	4.50e-04	531	406	Converged	5.12e-04	281	281	-6.20e-05	-1.38e-01	250	4.71e-01	125	3.08e-01
HS65	Converged	2.84e-04	327	239	Converged	2.53e-04	246	205	3.10e-05	1.09e-01	81	2.48e-01	34	1.42e-01
HS66	Converged	4.87e-04	794	447	Converged	2.37e-04	233	160	2.50e-04	5.13e-01	561	7.07e-01	287	6.42e-01
HS68	Converged	1.83e-03	1141	808	Converged	8.49e-04	507	419	9.79e-04	5.36e-01	634	5.56e-01	389	4.81e-01
HS7	Converged	1.25e-04	82	87	Converged	1.29e-04	82	87	-4.00e-06	-3.20e-02	0	0.00e+00	0	0.00e+00
HS70	Converged	1.60e-02	741	448	Converged	5.35e-03	185	162	1.07e-02	6.66e-01	556	7.50e-01	286	6.38e-01
HS71	Converged	3.35e-04	385	289	Converged	3.82e-04	373	318	-4.70e-05	-1.40e-01	12	3.12e-02	-29	-1.00e-01
HS72	Converged	5.03e-04	496	504	Converged	4.81e-04	496	504	2.20e-05	4.37e-02	0	0.00e+00	0	0.00e+00
HS73	Converged	9.31e-04	1205	804	Converged	7.41e-04	910	648	1.90e-04	2.04e-01	295	2.45e-01	156	1.94e-01
HS76	Converged	1.74e-04	147	113	Converged	3.12e-04	85	90	-1.38e-04	-7.93e-01	62	4.22e-01	23	2.04e-01
HS76I	Converged	1.64e-04	147	113	Converged	1.39e-04	85	90	2.50e-05	1.52e-01	62	4.22e-01	23	2.04e-01
HS77	Converged	9.40e-04	765	608	Converged	5.78e-04	355	351	3.62e-04	3.85e-01	410	5.36e-01	257	4.23e-01
HS78	Converged	2.85e-04	220	181	Converged	1.93e-04	142	142	9.20e-05	3.23e-01	78	3.55e-01	39	2.15e-01
HS79	Converged	6.35e-04	582	426	Converged	3.43e-04	238	238	2.92e-04	4.60e-01	344	5.91e-01	188	4.41e-01

name	status 0	time 0	f evaluations 0	grad_f evaluations 0	status 1	time 1	f evaluations 1	grad_f evaluations 1	time imprv	rel time imprv	f eval imprv	rel f eval imprv	grad_f eval imprv	rel grad_f eval imprv
HS8	Converged	2.65e-04	411	254	Converged	1.08e-04	80	79	1.57e-04	5.92e-01	331	8.05e-01	175	6.89e-01
HS80	Converged	2.60e-04	144	146	Converged	2.40e-04	144	146	2.00e-05	7.69e-02	0	0.00e+00	0	0.00e+00
HS81	Converged	3.37e-04	181	179	Converged	3.31e-04	181	179	6.00e-06	1.78e-02	0	0.00e+00	0	0.00e+00
HS83	Converged	3.15e-03	2709	2460	Converged	2.44e-03	2444	2314	7.14e-04	2.26e-01	265	9.78e-02	146	5.93e-02
HS86	Converged	1.08e-03	440	393	Converged	9.14e-04	358	348	1.65e-04	1.53e-01	82	1.86e-01	45	1.15e-01
HS88	Converged	1.75e-01	1115	658	Converged	5.49e-02	321	260	1.20e-01	6.85e-01	794	7.12e-01	398	6.05e-01
HS89	Converged	2.19e-01	1320	796	Converged	5.15e-02	274	244	1.67e-01	7.65e-01	1046	7.92e-01	552	6.93e-01
HS9	Converged	1.64e-04	132	76	Converged	1.62e-04	132	76	2.00e-06	1.22e-02	0	0.00e+00	0	0.00e+00
HS90	Converged	2.50e-01	993	607	Converged	8.08e-02	289	245	1.69e-01	6.76e-01	704	7.09e-01	362	5.96e-01
HS91	Converged	7.68e+01	197393	107629	Converged	1.16e-01	288	233	7.67e+01	9.98e-01	197105	9.99e-01	107396	9.98e-01
HS92	Converged	5.81e-01	1326	815	Converged	1.85e+00	2401	2310	-1.27e+00	-2.18e+00	-1075	-8.11e-01	-1495	-1.83e+00
HS95	Converged	2.14e-04	160	118	Converged	2.65e-04	160	118	-5.10e-05	-2.38e-01	0	0.00e+00	0	0.00e+00
HS96	Converged	2.06e-04	160	118	Converged	1.99e-04	160	118	7.00e-06	3.40e-02	0	0.00e+00	0	0.00e+00
HS97	Converged	1.36e-03	1365	884	Converged	1.21e-03	1357	810	1.50e-04	1.10e-01	8	5.86e-03	74	8.37e-02
HS98	Converged	1.00e-03	1099	757	Converged	1.16e-03	1356	810	-1.53e-04	-1.52e-01	-257	-2.34e-01	-53	-7.00e-02
HUBFIT	Converged	1.68e-04	162	124	Converged	1.33e-04	74	75	3.50e-05	2.08e-01	88	5.43e-01	49	3.95e-01
HUES-MOD	Converged	7.29e+00	11106	7741	Converged	3.83e+00	5889	4122	3.47e+00	4.75e-01	5217	4.70e-01	3619	4.68e-01
HYDROELL	Converged	2.94e+00	17823	16776	Converged	2.29e+01	217462	129352	-1.99e+01	-6.77e+00	-199639	-1.12e+01	-112576	-6.71e+00
HYDROELM	Converged	7.97e-01	10578	9540	Converged	7.47e-01	9613	9292	4.93e-02	6.19e-02	965	9.12e-02	248	2.60e-02
HYDROELS	Converged	1.23e-01	5354	4453	Converged	8.76e-02	3450	3265	3.58e-02	2.90e-01	1904	3.56e-01	1188	2.67e-01
HYPCIR	Converged	2.04e-04	379	221	Converged	9.00e-05	72	70	1.14e-04	5.59e-01	307	8.10e-01	151	6.83e-01
INTEGREQ	Converged	6.95e-01	104	109	Converged	8.62e-01	104	109	-1.67e-01	-2.41e-01	0	0.00e+00	0	0.00e+00
INTEQNE	Converged	2.46e-04	68	72	Converged	2.22e-04	68	72	2.40e-05	9.76e-02	0	0.00e+00	0	0.00e+00
JANNSON4	Converged	2.58e+00	2398	2226	Converged	2.98e+01	42254	23086	-2.72e+01	-1.05e+01	-39856	-1.66e+01	-20860	-9.37e+00
KISSING2	Converged	4.55e+01	570228	318023	Converged	1.35e+00	13041	11298	4.42e+01	9.70e-01	557187	9.77e-01	306725	9.64e-01
KIWCRESC	Converged	2.43e-02	366	265	Converged	1.85e-04	172	154	2.42e-02	9.92e-01	194	5.30e-01	111	4.19e-01
KSIP	Converged	3.62e-01	2686	2483	Converged	3.67e-01	2514	2433	-5.77e-03	-1.60e-02	172	6.40e-02	50	2.01e-02
LIARWHDNE	Converged	3.71e-01	501	312	Converged	1.87e-01	193	160	1.84e-01	4.96e-01	308	6.15e-01	152	4.87e-01
LINSPANH	Converged	2.60e-02	4994	3638	Converged	1.52e-02	3572	3086	1.08e-02	4.17e-01	1422	2.85e-01	552	1.52e-01
LOADBAL	Converged	7.75e-02	7277	6149	Converged	4.67e-02	5055	4437	3.08e-02	3.97e-01	2222	3.05e-01	1712	2.78e-01
LOTSCHD	Converged	1.13e-03	789	585	Converged	4.97e-02	46953	24659	-4.86e-02	-4.29e+01	-46164	-5.85e+01	-24074	-4.12e+01
LSNNODOC	Converged	4.87e-04	483	353	Converged	3.34e-04	242	228	1.53e-04	3.14e-01	241	4.99e-01	125	3.54e-01
LSQFIT	Converged	1.73e-04	165	126	Converged	1.41e-04	85	85	3.20e-05	1.85e-01	80	4.85e-01	41	3.25e-01
LUKVLI11	Converged	5.42e+00	1706	1519	Converged	7.56e+00	1470	1385	-2.14e+00	-3.94e-01	236	1.38e-01	134	8.82e-02
LUKVLI12	Converged	1.49e+01	4138	3882	Converged	9.06e+00	2133	2062	5.85e+00	3.92e-01	2005	4.85e-01	1820	4.69e-01
LUKVLI16	Converged	1.09e+01	4441	3903	Converged	8.55e+00	3442	3368	2.32e+00	2.13e-01	999	2.25e-01	535	1.37e-01
LUKVLI18	Converged	7.86e+00	3818	3265	Converged	5.31e+00	2339	2284	2.55e+00	3.24e-01	1479	3.87e-01	981	3.00e-01
LUKVLI3	Converged	1.76e+00	553	514	Converged	1.85e+00	440	439	-8.84e-02	-5.03e-02	113	2.04e-01	75	1.46e-01
LUKVLI5	Converged	5.21e+01	6083	5645	Converged	2.35e+01	2085	2005	2.86e+01	5.49e-01	3998	6.57e-01	3640	6.45e-01
MADSEN	Converged	2.82e-04	202	157	Converged	2.21e-04	129	123	6.10e-05	2.16e-01	73	3.61e-01	34	2.17e-01
MAKELA1	Converged	4.62e-04	723	469	Converged	1.36e-04	133	105	3.26e-04	7.06e-01	590	8.16e-01	364	7.76e-01
MAKELA2	Converged	3.57e-04	405	316	Converged	2.48e-04	216	202	1.09e-04	3.05e-01	189	4.67e-01	114	3.61e-01
MAKELA3	Converged	2.88e-03	1126	1053	Converged	2.83e-03	1126	1053	4.10e-05	1.43e-02	0	0.00e+00	0	0.00e+00
MAKELA4	Converged	3.28e-03	1042	841	Converged	2.28e-03	743	655	1.00e-03	3.05e-01	299	2.87e-01	186	2.21e-01
MANCINONE	Converged	8.88e-01	291	210	Converged	3.65e-01	106	104	5.23e-01	5.89e-01	185	6.36e-01	106	5.05e-01
MANNE	Converged	1.27e+00	1165	890	Converged	1.33e+00	807	711	-6.09e-02	-4.79e-02	358	3.07e-01	179	2.01e-01
MATRIX2	Converged	5.47e-04	787	407	Converged	1.73e-04	144	80	3.74e-04	6.84e-01	643	8.17e-01	327	8.03e-01
MGH09LS	Converged	3.89e-04	394	247	Converged	1.24e-03	1287	839	-8.51e-04	-2.19e+00	-893	-2.27e+00	-592	-2.40e+00
MGH17LS	Converged	2.40e-03	555	331	Converged	2.86e-03	693	420	-4.57e-04	-1.90e-01	-138	-2.49e-01	-89	-2.69e-01
MGH17SLS	Converged	3.32e-03	773	446	Converged	3.88e-03	1530	298	-5.61e-04	-1.69e-01	-757	-9.79e-01	148	3.32e-01
MIFFLIN1	Converged	1.44e-04	187	101	Converged	1.10e-04	109	62	3.40e-05	2.36e-01	78	4.17e-01	39	3.86e-01
MIFFLIN2	Converged	2.81e-04	394	275	Converged	2.38e-04	172	168	4.30e-05	1.53e-01	222	5.63e-01	107	3.89e-01
MINC44	Converged	8.15e-01	3284	3201	Converged	7.44e-01	3090	3085	7.08e-02	8.69e-02	194	5.91e-02	116	3.62e-02
MINMAXBD	Converged	1.67e-01	56440	53612	Converged	5.30e-02	18475	16657	1.14e-01	6.83e-01	37965	6.73e-01	36955	6.89e-01
MINMAXRB	Converged	4.13e-04	434	361	Converged	2.77e-04	322	291	1.36e-04	3.29e-01	112	2.58e-01	70	1.94e-01
MINPERM	Converged	6.31e-01	2660	2493	Converged	6.28e-01	2579	2569	3.55e-03	5.63e-03	81	3.05e-02	-76	-3.05e-02
MINSURFO	Converged	1.39e+00	1228	1012	Converged	1.53e+00	992	930	-1.48e-01	-1.07e-01	236	1.92e-01	82	8.10e-02
MISTAKE	Converged	9.44e-04	413	324	Converged	7.98e-04	342	304	1.46e-04	1.55e-01	71	1.72e-01	20	6.17e-02
MRIBASIS	Converged	2.31e-02	2329	1936	Converged	2.24e-02	1987	1893	6.85e-04	2.97e-02	342	1.47e-01	43	2.22e-02
MSQRTB	Converged	3.52e+01	20679	20517	Converged	3.28e+01	22878	22837	2.41e+00	6.86e-02	-2199	-1.06e-01	-2320	-1.13e-01
MSS1	Converged	7.41e-03	742	495	Converged	3.83e-03	350	279	3.58e-03	4.83e-01	392	5.28e-01	216	4.36e-01
MSS2	Converged	2.06e-01	2621	1573	Converged	5.32e+00	73354	39660	-5.12e+00	-2.49e+01	-70733	-2.70e+01	-38087	-2.42e+01
MSS3	Converged	1.58e+01	68163	39089	Converged	1.39e+01	63917	34953	1.93e+00	1.22e-01	4246	6.23e-02	4136	1.06e-01
MWRIGHT	Converged	3.95e-04	254	252	Converged	3.86e-04	254	252	9.00e-06	2.28e-02	0	0.00e+00	0	0.00e+00
NGONE	Converged	5.49e+01	87736	80717	Converged	4.26e+01	70352	68397	1.23e+01	2.24e-01	17384	1.98e-01	12320	1.53e-01
NYSTROM5	Converged	1.00e-01	15867	15710	Converged	7.40e-02	15279	15278	2.61e-02	2.61e-01	588	3.71e-02	432	2.75e-02
ODFITS	Converged	1.92e-03	625	552	Converged	1.98e-03	625	552	-6.50e-05	-3.39e-02	0	0.00e+00	0	0.00e+00

name	status 0	time 0	f evaluations 0	grad_f evaluations 0	status 1	time 1	f evaluations 1	grad_f evaluations 1	time imprv	rel time imprv	f eval imprv	rel f eval imprv	grad_f eval imprv	rel grad_f eval imprv
ORTHREGB	Converged	2.99e-03	861	613	Converged	2.19e-03	511	456	7.97e-04	2.67e-01	350	4.07e-01	157	2.56e-01
OSORIO	Converged	7.45e+01	70437	62915	Converged	5.01e+01	61605	55847	2.45e+01	3.28e-01	8832	1.25e-01	7068	1.12e-01
PENTAGON	Converged	1.45e-03	961	624	Converged	5.87e-04	317	277	8.63e-04	5.95e-01	644	6.70e-01	347	5.56e-01
POLAK3	Converged	2.10e-02	1163	990	Converged	1.99e-02	948	929	1.17e-03	5.55e-02	215	1.85e-01	61	6.16e-02
POLAK4	Converged	2.41e-01	266958	257105	Converged	1.02e-01	81035	41120	1.38e-01	5.74e-01	185923	6.96e-01	215985	8.40e-01
POLAK5	Converged	5.69e-03	6804	6343	Converged	3.36e-03	4410	4158	2.33e-03	4.10e-01	2394	3.52e-01	2185	3.44e-01
PORTFL1	Converged	1.76e-02	2255	1619	Converged	3.27e-02	2139	1556	-1.52e-02	-8.62e-01	116	5.14e-02	63	3.89e-02
PORTFL2	Converged	4.36e-02	2012	1504	Converged	3.14e-02	1944	1450	1.22e-02	2.80e-01	68	3.38e-02	54	3.59e-02
PORTFL3	Converged	1.13e-02	1348	987	Converged	9.35e-03	1122	838	1.97e-03	1.74e-01	226	1.68e-01	149	1.51e-01
PORTFL4	Converged	1.48e-02	1856	1357	Converged	2.05e-02	1892	1407	-5.73e-03	-3.88e-01	-36	-1.94e-02	-50	-3.68e-02
PORTFL6	Converged	1.39e-02	1744	1275	Converged	9.27e-03	1350	1021	4.67e-03	3.35e-01	394	2.26e-01	254	1.99e-01
POWELLSQ	Converged	1.81e-04	296	152	Converged	8.60e-05	97	43	9.50e-05	5.25e-01	199	6.72e-01	109	7.17e-01
PRICE3NE	Converged	2.36e-04	418	254	Converged	1.10e-04	100	94	1.26e-04	5.34e-01	318	7.61e-01	160	6.30e-01
PRICE4NE	Converged	2.80e-04	461	294	Converged	1.39e-04	106	97	1.41e-04	5.04e-01	355	7.70e-01	197	6.70e-01
PRIMAL1	Converged	7.42e-02	1545	1486	Converged	9.93e-02	1469	1449	-2.51e-02	-3.39e-01	76	4.92e-02	37	2.49e-02
PRIMAL2	Converged	8.04e-02	1109	1016	Converged	1.22e-01	821	802	-4.17e-02	-5.18e-01	288	2.60e-01	214	2.11e-01
PRIMAL3	Converged	1.39e-01	992	933	Converged	2.95e-01	912	892	-1.57e-01	-1.13e+00	80	8.06e-02	41	4.39e-02
PRIMAL4	Converged	2.16e-01	929	788	Converged	1.61e-01	554	529	5.48e-02	2.54e-01	375	4.04e-01	259	3.29e-01
PRIMALC2	Converged	7.59e+00	484192	388780	Converged	4.07e+00	251554	148317	3.51e+00	4.63e-01	232638	4.80e-01	240463	6.19e-01
PRODPL0	Converged	4.75e-02	13455	9526	Converged	4.97e-02	4106	3954	-2.13e-03	-4.49e-02	9349	6.95e-01	5572	5.85e-01
PRODPL1	Converged	2.25e-02	5533	5083	Converged	3.01e-02	7150	6761	-7.65e-03	-3.40e-01	-1617	-2.92e-01	-1678	-3.30e-01
QC	Converged	1.50e-01	55876	30874	Converged	2.06e-01	55876	30874	-5.61e-02	-3.75e-01	0	0.00e+00	0	0.00e+00
QPCBLEND	Converged	1.13e+00	105798	99047	Converged	1.26e+00	113841	109717	-1.28e-01	-1.13e-01	-8043	-7.60e-02	-10670	-1.08e-01
QPNBLEND	Converged	1.85e+00	129169	121586	Converged	4.38e+00	519295	340554	-2.53e+00	-1.36e+00	-390126	-3.02e+00	-218968	-1.80e+00
RES	Converged	6.80e-05	19	3	Converged	5.50e-05	19	3	1.30e-05	1.91e-01	0	0.00e+00	0	0.00e+00
RK23	Converged	9.68e-03	4118	3947	Converged	2.63e-02	4734	4718	-1.66e-02	-1.71e+00	-616	-1.50e-01	-771	-1.95e-01
ROBOT	Converged	9.34e-04	350	248	Converged	5.43e-04	164	152	3.91e-04	4.19e-01	186	5.31e-01	96	3.87e-01
ROSENBR	Converged	4.43e-04	1305	777	Converged	1.17e-04	181	165	3.26e-04	7.36e-01	1124	8.61e-01	612	7.88e-01
ROSENMMX	Converged	4.32e-03	3750	3373	Converged	9.02e-03	8659	8360	-4.70e-03	-1.09e+00	-4909	-1.31e+00	-4987	-1.48e+00
S368	Converged	3.35e-04	38	42	Converged	3.54e-04	38	42	-1.90e-05	-5.67e-02	0	0.00e+00	0	0.00e+00
STREGNE	Converged	1.43e-02	14919	8587	Converged	1.86e-02	9262	6453	-4.33e-03	-3.03e-01	5657	3.79e-01	2134	2.49e-01
STRTCHDVNE	Converged	4.84e-04	72	78	Converged	5.07e-04	72	78	-2.30e-05	-4.75e-02	0	0.00e+00	0	0.00e+00
SUPERSIM	Converged	1.19e-04	145	108	Converged	8.10e-05	60	64	3.80e-05	3.19e-01	85	5.86e-01	44	4.07e-01
SYNTHES1	Converged	9.03e-04	826	542	Converged	4.76e-04	329	280	4.27e-04	4.73e-01	497	6.02e-01	262	4.83e-01
SYNTHES2	Converged	2.95e-02	7998	7291	Converged	3.29e-02	12878	10636	-3.45e-03	-1.17e-01	-4880	-6.10e-01	-3345	-4.59e-01
SYNTHES3	Converged	2.61e-02	3501	3084	Converged	4.03e-01	122716	67434	-3.77e-01	-1.44e+01	-119215	-3.41e+01	-64350	-2.09e+01
TRY-B	Converged	1.18e-04	134	89	Converged	9.60e-05	70	60	2.20e-05	1.86e-01	64	4.78e-01	29	3.26e-01
TWOBARS	Converged	1.76e-04	180	137	Converged	1.18e-04	96	86	5.80e-05	3.30e-01	84	4.67e-01	51	3.72e-01
WACHBIEG	Converged	5.18e-04	858	554	Converged	1.46e-04	101	94	3.72e-04	7.18e-01	757	8.82e-01	460	8.30e-01
WATER	Converged	3.07e-01	91004	61887	Converged	6.04e-01	147766	104991	-2.97e-01	-9.65e-01	-56762	-6.24e-01	-43104	-6.96e-01
WOMFLET	Converged	6.32e-03	7322	6677	Converged	9.22e-04	1306	840	5.40e-03	8.54e-01	6016	8.22e-01	5837	8.74e-01
YFITNE	Converged	2.33e-01	58998	57320	Converged	1.21e+00	209858	197789	-9.75e-01	-4.18e+00	-150860	-2.56e+00	-140469	-2.45e+00
ZAMB2-8	Converged	4.49e-01	25103	23015	Converged	5.24e-01	30436	27770	-7.48e-02	-1.67e-01	-5333	-2.12e-01	-4755	-2.07e-01
ZANGWIL3	Converged	1.77e-04	236	154	Converged	1.20e-04	86	82	5.70e-05	3.22e-01	150	6.36e-01	72	4.68e-01
ZECEVIC2	Converged	1.37e-04	153	113	Converged	9.40e-05	74	70	4.30e-05	3.14e-01	79	5.16e-01	43	3.81e-01
ZECEVIC3	Converged	1.75e-04	177	139	Converged	1.32e-04	100	100	4.30e-05	2.46e-01	77	4.35e-01	39	2.81e-01
ZECEVIC4	Converged	1.04e-04	77	68	Converged	1.00e-04	77	68	4.00e-06	3.85e-02	0	0.00e+00	0	0.00e+00
ZY2	Converged	1.22e-04	115	75	Converged	8.00e-05	38	36	4.20e-05	3.44e-01	77	6.70e-01	39	5.20e-01

In [15]:
```
cmp = compare_results(base_df[both_converged], new_df[both_converged], ['status', 'linesearch failures', 'L-BFGS failures', 'L-BFGS rejected'])
cmp['ls imprv'] = cmp['linesearch failures 0'] - cmp['linesearch failures 1']
cmp['rel ls imprv'] = cmp['ls imprv'] / cmp['linesearch failures 0']
cmp['lbfgs imprv'] = cmp['L-BFGS failures 0'] - cmp['L-BFGS failures 1']
cmp['rel lbfgs imprv'] = cmp['lbfgs imprv'] / cmp['L-BFGS failures 0']
cmp['lbfgs rej imprv'] = cmp['L-BFGS rejected 0'] - cmp['L-BFGS rejected 1']
cmp['rel lbfgs rej imprv'] = cmp['lbfgs rej imprv'] / cmp['L-BFGS rejected 0']
print(f"Net linesearch failures improvement:    {cmp['ls imprv'].sum()}")
print(f"Relative linesearch improvement:        {100. * cmp['ls imprv'].sum() / cmp['linesearch failures 0'].sum():.02f}%")
print(f"Net L-BFGS failures improvement:        {cmp['lbfgs imprv'].sum()}")
print(f"Relative L-BFGS failures improvement:   {100. * cmp['lbfgs imprv'].sum() / cmp['L-BFGS failures 0'].sum():.02f}%")
print(f"Net L-BFGS rejections improvement:      {cmp['lbfgs rej imprv'].sum()}")
print(f"Relative L-BFGS rejections improvement: {100. * cmp['lbfgs rej imprv'].sum() / cmp['L-BFGS rejected 0'].sum():.02f}%")

cmp.style.applymap(color_negative_red_positive_green, subset=['ls imprv', 'rel ls imprv', 'lbfgs imprv', 'rel lbfgs imprv', 'lbfgs rej imprv', 'rel lbfgs rej imprv']) \
         .format('{:.2e}', subset=(cmp.dtypes == float))
```

```
Net linesearch failures improvement:    2931
Relative linesearch improvement:        74.58%
Net L-BFGS failures improvement:        0
Relative L-BFGS failures improvement:   nan%
Net L-BFGS rejections improvement:      411126
Relative L-BFGS rejections improvement: 45.00%
```

```
<ipython-input-15-b9487c206ea4>:11: RuntimeWarning: invalid value encountered in double_scalars
  print(f"Relative L-BFGS failures improvement:   {100. * cmp['lbfgs imprv'].sum() / cmp['L-BFGS failures 0'].sum():.02f}%")
```

Out[15]:

name	status 0	linesearch failures 0	L-BFGS failures 0	L-BFGS rejected 0	status 1	linesearch failures 1	L-BFGS failures 1	L-BFGS rejected 1	ls imprv	rel ls imprv	lbfgs imprv	rel lbfgs imprv	lbfgs rej imprv	rel lbfgs rej imprv
3PK	Converged	117	0	0	Converged	0	0	0	117	1.00e+00	0	nan	0	nan
A5NSDSDM	Converged	4	0	0	Converged	0	0	0	4	1.00e+00	0	nan	0	nan
A5NSSNSM	Converged	4	0	0	Converged	0	0	0	4	1.00e+00	0	nan	0	nan
AIRCRFTA	Converged	6	0	0	Converged	0	0	0	6	1.00e+00	0	nan	0	nan
ALLINITA	Converged	4	0	5844	Converged	0	0	2906	4	1.00e+00	0	nan	2938	5.03e-01
ALLINITC	Converged	25	0	36435	Converged	0	0	14715	25	1.00e+00	0	nan	21720	5.96e-01
ALSOTAME	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
AVGASA	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
AVGASB	Converged	2	0	0	Converged	0	0	0	2	1.00e+00	0	nan	0	nan
BA-L1	Converged	6	0	0	Converged	0	0	0	6	1.00e+00	0	nan	0	nan
BA-L1SP	Converged	6	0	0	Converged	0	0	0	6	1.00e+00	0	nan	0	nan
BEALENE	Converged	6	0	0	Converged	0	0	0	6	1.00e+00	0	nan	0	nan
BIGGSC4	Converged	3	0	0	Converged	0	0	0	3	1.00e+00	0	nan	0	nan
BOOTH	Converged	2	0	0	Converged	0	0	0	2	1.00e+00	0	nan	0	nan
BOX3NE	Converged	3	0	0	Converged	0	0	0	3	1.00e+00	0	nan	0	nan
BRITGAS	Converged	5	0	0	Converged	0	0	0	5	1.00e+00	0	nan	0	nan
BROWNBSNE	Converged	3	0	0	Converged	0	0	0	3	1.00e+00	0	nan	0	nan
BT1	Converged	4	0	0	Converged	0	0	0	4	1.00e+00	0	nan	0	nan
BT10	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
BT11	Converged	2	0	0	Converged	0	0	0	2	1.00e+00	0	nan	0	nan
BT12	Converged	8	0	0	Converged	0	0	0	8	1.00e+00	0	nan	0	nan
BT13	Converged	3	0	0	Converged	0	0	0	3	1.00e+00	0	nan	0	nan
BT2	Converged	22	0	0	Converged	0	0	0	22	1.00e+00	0	nan	0	nan
BT3	Converged	5	0	0	Converged	0	0	0	5	1.00e+00	0	nan	0	nan
BT4	Converged	5	0	0	Converged	0	0	0	5	1.00e+00	0	nan	0	nan
BT5	Converged	4	0	2950	Converged	0	0	3341	4	1.00e+00	0	nan	-391	-1.33e-01
BT6	Converged	5	0	0	Converged	0	0	0	5	1.00e+00	0	nan	0	nan
BT7	Converged	9	0	1890	Converged	0	0	1893	9	1.00e+00	0	nan	-3	-1.59e-03
BT8	Converged	2	0	0	Converged	0	0	0	2	1.00e+00	0	nan	0	nan
BT9	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
BYRDSPHR	Converged	3	0	0	Converged	0	0	0	3	1.00e+00	0	nan	0	nan
C-RELOAD	Converged	56	0	0	Converged	0	0	0	56	1.00e+00	0	nan	0	nan
CANTILVR	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
CHACONN1	Converged	3	0	0	Converged	0	0	0	3	1.00e+00	0	nan	0	nan
CHACONN2	Converged	3	0	0	Converged	0	0	0	3	1.00e+00	0	nan	0	nan
CLUSTER	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
CONGIGMZ	Converged	3	0	0	Converged	0	0	0	3	1.00e+00	0	nan	0	nan
CUBENE	Converged	4	0	0	Converged	0	0	0	4	1.00e+00	0	nan	0	nan
DECONVBNE	Converged	9	0	0	Converged	0	0	0	9	1.00e+00	0	nan	0	nan
DECONVC	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
DECONVNE	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
DECONVU	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
DEMYMALO	Converged	5	0	0	Converged	0	0	0	5	1.00e+00	0	nan	0	nan
DIPIGRI	Converged	38	0	112662	Converged	0	0	18595	38	1.00e+00	0	nan	94067	8.35e-01
DISC2	Converged	4	0	0	Converged	0	0	0	4	1.00e+00	0	nan	0	nan
DISCS	Converged	10	0	0	Converged	1	0	47	9	9.00e-01	0	nan	-47	-inf
DUAL1	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
DUAL2	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
DUAL3	Converged	2	0	0	Converged	0	0	0	2	1.00e+00	0	nan	0	nan

name	status 0	linesearch failures 0	L-BFGS failures 0	L-BFGS rejected 0	status 1	linesearch failures 1	L-BFGS failures 1	L-BFGS rejected 1	ls imprv	rel ls imprv	lbfgs imprv	rel lbfgs imprv	lbfgs rej imprv	rel lbfgs rej imprv
DUAL4	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
DUALC1	Converged	2	0	2924	Converged	0	0	927	2	1.00e+00	0	nan	1997	6.83e-01
DUALC2	Converged	0	0	1972	Converged	0	0	2916	0	nan	0	nan	-944	-4.79e-01
DUALC5	Converged	3	0	5934	Converged	0	0	981	3	1.00e+00	0	nan	4953	8.35e-01
EG2	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
EQC	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
EXPFITA	Converged	5	0	0	Converged	0	0	0	5	1.00e+00	0	nan	0	nan
EXPFITB	Converged	4	0	0	Converged	0	0	0	4	1.00e+00	0	nan	0	nan
EXTROSNBNE	Converged	10	0	0	Converged	0	0	0	10	1.00e+00	0	nan	0	nan
FCCU	Converged	2	0	0	Converged	0	0	0	2	1.00e+00	0	nan	0	nan
FEEDLOC	Converged	8	0	0	Converged	0	0	0	8	1.00e+00	0	nan	0	nan
FERRISDC	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
GAUSSELM	Converged	3	0	0	Converged	0	0	0	3	1.00e+00	0	nan	0	nan
GIGOMEZ1	Converged	6	0	4	Converged	0	0	4	6	1.00e+00	0	nan	0	0.00e+00
GIGOMEZ2	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
GIGOMEZ3	Converged	2	0	0	Converged	0	0	0	2	1.00e+00	0	nan	0	nan
GILBERT	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
GMNCASE1	Converged	5	0	0	Converged	0	0	0	5	1.00e+00	0	nan	0	nan
GMNCASE2	Converged	5	0	0	Converged	0	0	0	5	1.00e+00	0	nan	0	nan
GMNCASE3	Converged	2	0	0	Converged	0	0	0	2	1.00e+00	0	nan	0	nan
GOFFIN	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
GOULDQP1	Converged	16	0	8176	Converged	0	0	6583	16	1.00e+00	0	nan	1593	1.95e-01
GOULDQP2	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
GOULDQP3	Converged	4	0	0	Converged	0	0	0	4	1.00e+00	0	nan	0	nan
HAIFAS	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
HALDMADS	Converged	16	0	1017	Converged	0	0	0	16	1.00e+00	0	nan	1017	1.00e+00
HARKERP2	Converged	2	0	0	Converged	0	0	0	2	1.00e+00	0	nan	0	nan
HATFLDF	Converged	2	0	0	Converged	0	0	0	2	1.00e+00	0	nan	0	nan
HATFLDG	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
HATFLDH	Converged	4	0	0	Converged	0	0	0	4	1.00e+00	0	nan	0	nan
HELIXNE	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
HET-Z	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
HIE1372D	Converged	75	0	52786	Converged	0	0	0	75	1.00e+00	0	nan	52786	1.00e+00
HILBERTA	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
HILBERTB	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
HIMMELBA	Converged	2	0	0	Converged	0	0	0	2	1.00e+00	0	nan	0	nan
HIMMELBB	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
HIMMELBC	Converged	2	0	0	Converged	0	0	0	2	1.00e+00	0	nan	0	nan
HIMMELBCLS	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
HIMMELBE	Converged	3	0	0	Converged	0	0	0	3	1.00e+00	0	nan	0	nan
HIMMELBG	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
HIMMELBH	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
HIMMELBK	Converged	8	0	0	Converged	0	0	0	8	1.00e+00	0	nan	0	nan
HIMMELP1	Converged	2	0	0	Converged	0	0	0	2	1.00e+00	0	nan	0	nan
HIMMELP2	Converged	2	0	0	Converged	0	0	0	2	1.00e+00	0	nan	0	nan
HIMMELP3	Converged	3	0	0	Converged	0	0	0	3	1.00e+00	0	nan	0	nan
HIMMELP5	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
HIMMELP6	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
HONG	Converged	2	0	0	Converged	0	0	0	2	1.00e+00	0	nan	0	nan
HS10	Converged	2	0	0	Converged	0	0	0	2	1.00e+00	0	nan	0	nan
HS100	Converged	34	0	142547	Converged	0	0	8853	34	1.00e+00	0	nan	133694	9.38e-01
HS100LNP	Converged	3	0	0	Converged	0	0	843	3	1.00e+00	0	nan	-843	-inf
HS100MOD	Converged	4	0	5933	Converged	0	0	2910	4	1.00e+00	0	nan	3023	5.10e-01
HS105	Converged	5	0	0	Converged	0	0	0	5	1.00e+00	0	nan	0	nan
HS107	Converged	41	0	88320	Converged	0	0	189492	41	1.00e+00	0	nan	-101172	-1.15e+00
HS108	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
HS11	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
HS110	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
HS118	Converged	4	0	0	Converged	0	0	0	4	1.00e+00	0	nan	0	nan
HS119	Converged	8	0	3409	Converged	0	0	3317	8	1.00e+00	0	nan	92	2.70e-02
HS12	Converged	3	0	0	Converged	0	0	0	3	1.00e+00	0	nan	0	nan
HS13	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
HS14	Converged	5	0	0	Converged	0	0	0	5	1.00e+00	0	nan	0	nan
HS15	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
HS16	Converged	2	0	0	Converged	0	0	0	2	1.00e+00	0	nan	0	nan
HS17	Converged	2	0	0	Converged	0	0	0	2	1.00e+00	0	nan	0	nan
HS18	Converged	4	0	0	Converged	0	0	0	4	1.00e+00	0	nan	0	nan

name	status 0	linesearch failures 0	L-BFGS failures 0	L-BFGS rejected 0	status 1	linesearch failures 1	L-BFGS failures 1	L-BFGS rejected 1	ls imprv	rel ls imprv	lbfgs imprv	rel lbfgs imprv	lbfgs rej imprv	rel lbfgs rej imprv
HS19	Converged	26	0	49788	Converged	0	0	14866	26	1.00e+00	0	nan	34922	7.01e-01
HS2	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
HS20	Converged	2	0	0	Converged	0	0	0	2	1.00e+00	0	nan	0	nan
HS21	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
HS21MOD	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
HS22	Converged	7	0	0	Converged	0	0	0	7	1.00e+00	0	nan	0	nan
HS23	Converged	6	0	0	Converged	0	0	0	6	1.00e+00	0	nan	0	nan
HS24	Converged	2	0	0	Converged	0	0	0	2	1.00e+00	0	nan	0	nan
HS25	Converged	4	0	0	Converged	0	0	0	4	1.00e+00	0	nan	0	nan
HS26	Converged	4	0	0	Converged	0	0	0	4	1.00e+00	0	nan	0	nan
HS27	Converged	2	0	0	Converged	0	0	0	2	1.00e+00	0	nan	0	nan
HS28	Converged	2	0	0	Converged	0	0	0	2	1.00e+00	0	nan	0	nan
HS29	Converged	4	0	0	Converged	0	0	0	4	1.00e+00	0	nan	0	nan
HS3	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
HS30	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
HS31	Converged	2	0	0	Converged	0	0	0	2	1.00e+00	0	nan	0	nan
HS32	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
HS33	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
HS34	Converged	6	0	1	Converged	0	0	0	6	1.00e+00	0	nan	1	1.00e+00
HS35	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
HS35I	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
HS35MOD	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
HS36	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
HS37	Converged	2	0	0	Converged	0	0	0	2	1.00e+00	0	nan	0	nan
HS38	Converged	3	0	0	Converged	0	0	0	3	1.00e+00	0	nan	0	nan
HS39	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
HS3MOD	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
HS4	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
HS40	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
HS41	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
HS42	Converged	2	0	0	Converged	0	0	0	2	1.00e+00	0	nan	0	nan
HS43	Converged	3	0	0	Converged	0	0	0	3	1.00e+00	0	nan	0	nan
HS44	Converged	4	0	0	Converged	0	0	0	4	1.00e+00	0	nan	0	nan
HS44NEW	Converged	5	0	0	Converged	0	0	0	5	1.00e+00	0	nan	0	nan
HS45	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
HS46	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
HS47	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
HS48	Converged	3	0	0	Converged	0	0	0	3	1.00e+00	0	nan	0	nan
HS49	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
HS5	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
HS50	Converged	2	0	0	Converged	0	0	0	2	1.00e+00	0	nan	0	nan
HS51	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
HS52	Converged	10	0	0	Converged	0	0	0	10	1.00e+00	0	nan	0	nan
HS53	Converged	5	0	0	Converged	0	0	0	5	1.00e+00	0	nan	0	nan
HS55	Converged	4	0	0	Converged	0	0	0	4	1.00e+00	0	nan	0	nan
HS56	Converged	6	0	0	Converged	0	0	0	6	1.00e+00	0	nan	0	nan
HS57	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
HS59	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
HS6	Converged	4	0	0	Converged	0	0	0	4	1.00e+00	0	nan	0	nan
HS60	Converged	2	0	0	Converged	0	0	0	2	1.00e+00	0	nan	0	nan
HS61	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
HS62	Converged	8	0	5925	Converged	0	0	3896	8	1.00e+00	0	nan	2029	3.42e-01
HS63	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
HS64	Converged	3	0	0	Converged	0	0	0	3	1.00e+00	0	nan	0	nan
HS65	Converged	2	0	0	Converged	0	0	0	2	1.00e+00	0	nan	0	nan
HS66	Converged	7	0	0	Converged	0	0	0	7	1.00e+00	0	nan	0	nan
HS68	Converged	7	0	0	Converged	0	0	0	7	1.00e+00	0	nan	0	nan
HS7	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
HS70	Converged	7	0	0	Converged	0	0	0	7	1.00e+00	0	nan	0	nan
HS71	Converged	2	0	0	Converged	0	0	0	2	1.00e+00	0	nan	0	nan
HS72	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
HS73	Converged	6	0	0	Converged	0	0	0	6	1.00e+00	0	nan	0	nan
HS76	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
HS76I	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
HS77	Converged	4	0	0	Converged	0	0	0	4	1.00e+00	0	nan	0	nan
HS78	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
HS79	Converged	4	0	0	Converged	0	0	0	4	1.00e+00	0	nan	0	nan

name	status 0	linesearch failures 0	L-BFGS failures 0	L-BFGS rejected 0	status 1	linesearch failures 1	L-BFGS failures 1	L-BFGS rejected 1	ls imprv	rel ls imprv	lbfgs imprv	rel lbfgs imprv	lbfgs rej imprv	rel lbfgs rej imprv
HS8	Converged	4	0	0	Converged	0	0	0	4	1.00e+00	0	nan	0	nan
HS80	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
HS81	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
HS83	Converged	4	0	985	Converged	0	0	988	4	1.00e+00	0	nan	-3	-3.05e-03
HS86	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
HS88	Converged	11	0	0	Converged	0	0	0	11	1.00e+00	0	nan	0	nan
HS89	Converged	12	0	0	Converged	0	0	0	12	1.00e+00	0	nan	0	nan
HS9	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
HS90	Converged	9	0	0	Converged	0	0	0	9	1.00e+00	0	nan	0	nan
HS91	Converged	924	0	4419	Converged	0	0	0	924	1.00e+00	0	nan	4419	1.00e+00
HS92	Converged	12	0	0	Converged	0	0	954	12	1.00e+00	0	nan	-954	-inf
HS95	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
HS96	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
HS97	Converged	1	0	2	Converged	0	0	1	1	1.00e+00	0	nan	1	5.00e-01
HS98	Converged	1	0	15	Converged	0	0	1	1	1.00e+00	0	nan	14	9.33e-01
HUBFIT	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
HUES-MOD	Converged	3	0	1326	Converged	1	0	922	2	6.67e-01	0	nan	404	3.05e-01
HYDROELL	Converged	15	0	0	Converged	0	0	10799	15	1.00e+00	0	nan	-10799	-inf
HYDROELM	Converged	18	0	0	Converged	0	0	0	18	1.00e+00	0	nan	0	nan
HYDROELS	Converged	17	0	0	Converged	0	0	0	17	1.00e+00	0	nan	0	nan
HYPCIR	Converged	4	0	0	Converged	0	0	0	4	1.00e+00	0	nan	0	nan
INTEGREQ	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
INTEQNE	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
JANNSON4	Converged	2	0	986	Converged	0	0	1925	2	1.00e+00	0	nan	-939	-9.52e-01
KISSING2	Converged	1242	0	21302	Converged	0	0	0	1242	1.00e+00	0	nan	21302	1.00e+00
KIWCRESC	Converged	2	0	0	Converged	0	0	0	2	1.00e+00	0	nan	0	nan
KSIP	Converged	3	0	0	Converged	0	0	0	3	1.00e+00	0	nan	0	nan
LIARWHDNE	Converged	4	0	0	Converged	0	0	0	4	1.00e+00	0	nan	0	nan
LINSPANH	Converged	4	0	0	Converged	0	0	0	4	1.00e+00	0	nan	0	nan
LOADBAL	Converged	6	0	0	Converged	0	0	0	6	1.00e+00	0	nan	0	nan
LOTSCHD	Converged	4	0	0	Converged	0	0	965	4	1.00e+00	0	nan	-965	-inf
LSNNODOC	Converged	3	0	0	Converged	0	0	0	3	1.00e+00	0	nan	0	nan
LSQFIT	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
LUKVLI11	Converged	2	0	0	Converged	0	0	0	2	1.00e+00	0	nan	0	nan
LUKVLI12	Converged	4	0	0	Converged	0	0	0	4	1.00e+00	0	nan	0	nan
LUKVLI16	Converged	12	0	0	Converged	0	0	0	12	1.00e+00	0	nan	0	nan
LUKVLI18	Converged	13	0	0	Converged	0	0	0	13	1.00e+00	0	nan	0	nan
LUKVLI3	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
LUKVLI5	Converged	8	0	0	Converged	0	0	0	8	1.00e+00	0	nan	0	nan
MADSEN	Converged	1	0	1	Converged	0	0	1	1	1.00e+00	0	nan	0	0.00e+00
MAKELA1	Converged	6	0	12	Converged	0	0	0	6	1.00e+00	0	nan	12	1.00e+00
MAKELA2	Converged	2	0	0	Converged	0	0	0	2	1.00e+00	0	nan	0	nan
MAKELA3	Converged	0	0	1	Converged	0	0	1	0	nan	0	nan	0	0.00e+00
MAKELA4	Converged	3	0	0	Converged	0	0	0	3	1.00e+00	0	nan	0	nan
MANCINONE	Converged	2	0	0	Converged	0	0	0	2	1.00e+00	0	nan	0	nan
MANNE	Converged	4	0	0	Converged	0	0	0	4	1.00e+00	0	nan	0	nan
MATRIX2	Converged	8	0	0	Converged	0	0	0	8	1.00e+00	0	nan	0	nan
MGH09LS	Converged	3	0	0	Converged	0	0	0	3	1.00e+00	0	nan	0	nan
MGH17LS	Converged	4	0	0	Converged	0	0	0	4	1.00e+00	0	nan	0	nan
MGH17SLS	Converged	2	0	0	Converged	0	0	0	2	1.00e+00	0	nan	0	nan
MIFFLIN1	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
MIFFLIN2	Converged	3	0	3	Converged	0	0	6	3	1.00e+00	0	nan	-3	-1.00e+00
MINC44	Converged	2	0	0	Converged	0	0	0	2	1.00e+00	0	nan	0	nan
MINMAXBD	Converged	31	0	25723	Converged	0	0	6207	31	1.00e+00	0	nan	19516	7.59e-01
MINMAXRB	Converged	1	0	1	Converged	0	0	0	1	1.00e+00	0	nan	1	1.00e+00
MINPERM	Converged	4	0	0	Converged	0	0	0	4	1.00e+00	0	nan	0	nan
MINSURFO	Converged	4	0	0	Converged	0	0	0	4	1.00e+00	0	nan	0	nan
MISTAKE	Converged	2	0	0	Converged	0	0	0	2	1.00e+00	0	nan	0	nan
MRIBASIS	Converged	8	0	0	Converged	0	0	0	8	1.00e+00	0	nan	0	nan
MSQRTB	Converged	4	0	0	Converged	0	0	0	4	1.00e+00	0	nan	0	nan
MSS1	Converged	5	0	0	Converged	0	0	0	5	1.00e+00	0	nan	0	nan
MSS2	Converged	4	0	0	Converged	0	0	2879	4	1.00e+00	0	nan	-2879	-inf
MSS3	Converged	12	0	4855	Converged	0	0	2880	12	1.00e+00	0	nan	1975	4.07e-01
MWRIGHT	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
NGONE	Converged	52	0	0	Converged	0	0	0	52	1.00e+00	0	nan	0	nan
NYSTROM5	Converged	4	0	0	Converged	0	0	0	4	1.00e+00	0	nan	0	nan
ODFITS	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan

name	status 0	linesearch failures 0	L-BFGS failures 0	L-BFGS rejected 0	status 1	linesearch failures 1	L-BFGS failures 1	L-BFGS rejected 1	ls imprv	rel ls imprv	lbfgs imprv	rel lbfgs imprv	lbfgs rej imprv	rel lbfgs rej imprv
ORTHREGB	Converged	5	0	0	Converged	0	0	0	5	1.00e+00	0	nan	0	nan
OSORIO	Converged	38	0	0	Converged	0	0	0	38	1.00e+00	0	nan	0	nan
PENTAGON	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
POLAK3	Converged	4	0	0	Converged	0	0	0	4	1.00e+00	0	nan	0	nan
POLAK4	Converged	87	0	125795	Converged	986	0	0	-899	-1.03e+01	0	nan	125795	1.00e+00
POLAK5	Converged	5	0	2994	Converged	0	0	1978	5	1.00e+00	0	nan	1016	3.39e-01
PORTFL1	Converged	2	0	0	Converged	0	0	0	2	1.00e+00	0	nan	0	nan
PORTFL2	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
PORTFL3	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
PORTFL4	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
PORTFL6	Converged	2	0	0	Converged	0	0	0	2	1.00e+00	0	nan	0	nan
POWELLSQ	Converged	3	0	0	Converged	0	0	0	3	1.00e+00	0	nan	0	nan
PRICE3NE	Converged	4	0	0	Converged	0	0	0	4	1.00e+00	0	nan	0	nan
PRICE4NE	Converged	4	0	0	Converged	0	0	0	4	1.00e+00	0	nan	0	nan
PRIMAL1	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
PRIMAL2	Converged	2	0	0	Converged	0	0	0	2	1.00e+00	0	nan	0	nan
PRIMAL3	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
PRIMAL4	Converged	3	0	0	Converged	0	0	0	3	1.00e+00	0	nan	0	nan
PRIMALC2	Converged	18	0	145021	Converged	0	0	21780	18	1.00e+00	0	nan	123241	8.50e-01
PRODPL0	Converged	6	0	744	Converged	0	0	0	6	1.00e+00	0	nan	744	1.00e+00
PRODPL1	Converged	6	0	0	Converged	0	0	202	6	1.00e+00	0	nan	-202	-inf
QC	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
QPCBLEND	Converged	73	0	0	Converged	0	0	0	73	1.00e+00	0	nan	0	nan
QPNBLEND	Converged	90	0	0	Converged	2	0	34813	88	9.78e-01	0	nan	-34813	-inf
RES	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
RK23	Converged	4	0	0	Converged	0	0	0	4	1.00e+00	0	nan	0	nan
ROBOT	Converged	2	0	0	Converged	0	0	0	2	1.00e+00	0	nan	0	nan
ROSENBR	Converged	4	0	0	Converged	0	0	0	4	1.00e+00	0	nan	0	nan
ROSENMMX	Converged	6	0	1401	Converged	0	0	4001	6	1.00e+00	0	nan	-2600	-1.86e+00
S368	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
STREGNE	Converged	23	0	0	Converged	9	0	0	14	6.09e-01	0	nan	0	nan
STRTCHDVNE	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
SUPERSIM	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
SYNTHES1	Converged	6	0	0	Converged	0	0	0	6	1.00e+00	0	nan	0	nan
SYNTHES2	Converged	13	0	2865	Converged	0	0	3827	13	1.00e+00	0	nan	-962	-3.36e-01
SYNTHES3	Converged	8	0	926	Converged	0	0	5717	8	1.00e+00	0	nan	-4791	-5.17e+00
TRY-B	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
TWOBARS	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
WACHBIEG	Converged	4	0	0	Converged	0	0	0	4	1.00e+00	0	nan	0	nan
WATER	Converged	7	0	14879	Converged	0	0	30712	7	1.00e+00	0	nan	-15833	-1.06e+00
WOMFLET	Converged	8	0	2919	Converged	0	0	87	8	1.00e+00	0	nan	2832	9.70e-01
YFITNE	Converged	14	0	27973	Converged	0	0	93808	14	1.00e+00	0	nan	-65835	-2.35e+00
ZAMB2-8	Converged	14	0	0	Converged	0	0	0	14	1.00e+00	0	nan	0	nan
ZANGWIL3	Converged	2	0	0	Converged	0	0	0	2	1.00e+00	0	nan	0	nan
ZECEVIC2	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
ZECEVIC3	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan
ZECEVIC4	Converged	0	0	0	Converged	0	0	0	0	nan	0	nan	0	nan
ZY2	Converged	1	0	0	Converged	0	0	0	1	1.00e+00	0	nan	0	nan

In [16]:
```
base_df[base_df['ε'] == 0]
```

Out[16]:

name	status	time	inner iterations	outer iterations	inner convergence failures	f	ε	δ	f evaluations	grad_f evaluations	g evaluations	grad_g evaluations	linesearch failures	L-BFGS failures	L-BFGS rejected	‖Σ‖	‖x‖	‖y‖
EQC	Converged	0.092393	1001	2	1	-829.547705	0.0	0.00	37934	19972	37938	19972	0	0	0	1.732051e+00	0.876608	0.000000e+00
HIMMELP3	Converged	0.002910	144	2	0	-59.013178	0.0	0.00	4316	2291	4320	2291	3	0	0	1.414214e+00	99.247166	0.000000e+00
HIMMELP5	Converged	0.000139	8	1	0	-59.013178	0.0	0.00	104	59	106	59	1	0	0	1.732051e+00	99.247166	0.000000e+00
HIMMELP6	Converged	0.000134	8	1	0	-59.013178	0.0	0.00	104	59	106	59	1	0	0	2.236068e+00	99.247166	0.000000e+00
HS24	Converged	0.000165	11	4	0	0.000000	0.0	0.00	221	117	229	117	2	0	0	1.000100e+02	5.999870	0.000000e+00
HS30	Converged	0.000042	2	1	0	1.000000	0.0	0.00	7	7	9	7	0	0	0	1.000000e+00	1.000000	0.000000e+00
HS4	Converged	0.000030	1	1	0	2.666667	0.0	0.00	4	5	6	5	0	0	0	0.000000e+00	1.000000	0.000000e+00
HS45	Converged	0.000042	5	3	0	1.000000	0.0	0.00	30	26	36	26	0	0	0	0.000000e+00	7.416198	0.000000e+00
HS93	MaxIter	0.000958	25	200	0	0.000000	0.0	2.07	499	673	899	673	0	0	0	1.000000e+15	13.752958	2.070001e+15
QC	Converged	0.149588	2930	3	2	-956.537733	0.0	0.00	55876	30874	55882	30874	0	0	0	2.000000e+00	0.381156	0.000000e+00

In [17]:
```
new_df[new_df['ε'] == 0]
```

Out[17]:

name	status	time	inner iterations	outer iterations	inner convergence failures	f	ε	δ	f evaluations	grad_f evaluations	g evaluations	grad_g evaluations	linesearch failures	L-BFGS failures	L-BFGS rejected	‖Σ‖	‖x‖	‖y‖
EQC	Converged	0.092359	1001	2	1	-829.547705	0.0	0.00	37934	19972	37938	19972	0	0	0	1.732051e+00	0.876608	0.000000e+00
HARKERP2	Converged	13.140290	886	4	0	-0.500000	0.0	0.00	3872	2813	3880	2813	0	0	0	0.000000e+00	1	0.000000e+00
HIMMELP3	Converged	0.000094	6	2	0	-59.013178	0.0	0.00	89	27	93	27	0	0	0	1.414214e+00	99.247166	0.000000e+00
HIMMELP4	Converged	0.000103	6	2	0	-59.013178	0.0	0.00	89	27	93	27	0	0	0	1.732051e+00	99.247166	0.000000e+00
HIMMELP5	Converged	0.000087	8	2	0	-59.013178	0.0	0.00	39	25	43	25	0	0	0	1.732051e+00	99.247166	0.000000e+00
HIMMELP6	Converged	0.000084	8	2	0	-59.013178	0.0	0.00	39	25	43	25	0	0	0	2.236068e+00	99.247166	0.000000e+00
HS30	Converged	0.000045	2	1	0	1.000000	0.0	0.00	7	7	9	7	0	0	0	1.000000e+00	1	0.000000e+00
HS4	Converged	0.000037	1	1	0	2.666667	0.0	0.00	4	5	6	5	0	0	0	0.000000e+00	1	0.000000e+00
HS45	Converged	0.000044	5	3	0	1.000000	0.0	0.00	30	26	36	26	0	0	0	0.000000e+00	7.416198	0.000000e+00
HS93	MaxIter	0.000900	25	200	0	0.000000	0.0	2.07	499	673	899	673	0	0	0	1.000000e+15	13.752958	2.070001e+15
MANNE	Converged	1.332107	327	6	0	-0.974573	0.0	0.00	807	711	819	711	0	0	0	2.356573e+02	5278.802781	0.000000e+00
QC	Converged	0.205725	2930	3	2	-956.537733	0.0	0.00	55876	30874	55882	30874	0	0	0	2.000000e+00	0.381156	0.000000e+00