

----- Short Iteration -----

theta0\_vec =

-9  
36  
-18  
-112  
0  
88

----- Iteration 1 -----

Joint Vector:

-9    36    -18    -112    0    88

SE(3) end-effector config:

0.8748	-0.2546	0.4121	-0.0863
0.3957	-0.1152	-0.9111	-0.2487
0.2794	0.9602	0	0.7128
0	0	0	1.0000

error twist V\_b: (0.051, 0.358, -0.280, -0.348, -0.167, 0.082)

angular error || $\omega_b$ ||: 4.575661e-01

linear error ||v\_b||: 3.949115e-01

----- Iteration 2 -----

Joint Vector:

-2.4559    -1.5461    1.7629    0.3790    -0.1069    -0.5927

SE(3) end-effector config:

0.7150	-0.0422	0.6979	-0.1369
0.6992	0.0425	-0.7137	-0.3582
0.0004	0.9982	0.0598	0.3558
0	0	0	1.0000

error twist V\_b: (0.060, 0.011, -0.000, -0.216, 0.145, -0.010)

angular error || $\omega_b$ ||: 6.091898e-02

linear error ||v\_b||: 2.598339e-01

----- Iteration 3 -----

Joint Vector:

-2.4536    -1.2214    0.9700    0.3353    -0.0807    -0.0840

SE(3) end-effector config:

0.7190	-0.0044	0.6950	-0.2733
0.6950	0.0051	-0.7190	-0.4716
-0.0003	1.0000	0.0068	0.4917
0	0	0	1.0000

error twist V\_b: (0.007, 0.017, 0.000, -0.039, 0.008, 0.002)

angular error || $\omega_b$ ||: 1.824818e-02

```
linear error      ||v_b||: 3.983725e-02

----- Iteration 4 -----
Joint Vector:
  -2.4444   -1.1251    0.8116    0.3059   -0.0878    0.0076

SE(3) end-effector config:
  0.7073    0.0005    0.7069   -0.2989
  0.7069   -0.0005   -0.7073   -0.4991
 -0.0000    1.0000   -0.0007    0.4983
      0         0         0    1.0000

      error twist V_b: (-0.001, 0.000, 0.000, -0.001, 0.002, -0.000)
angular error ||omega_b||: 7.398803e-04
linear error      ||v_b||: 2.182614e-03

----- Iteration 5 -----
Joint Vector:
  -2.4444   -1.1168    0.7949    0.3220   -0.0882   -0.0000

SE(3) end-effector config:
  0.7071   -0.0000    0.7071   -0.3000
  0.7071    0.0000   -0.7071   -0.5000
 -0.0000    1.0000    0.0000    0.5000
      0         0         0    1.0000

      error twist V_b: (0.000, 0.000, 0.000, -0.000, 0.000, -0.000)
angular error ||omega_b||: 3.528689e-06
linear error      ||v_b||: 2.410856e-05
```

```
theta_vec =
```

```
-2.4444
-1.1168
 0.7949
 0.3220
-0.0882
-0.0000
```

```
----- Long Iteration -----
```

```
theta0_vec =
```

```
0
0
0
0
0
0
0
```

----- Iteration 1 -----

Joint Vector:

0 0 0 0 0 0

SE(3) end-effector config:

-1.0000	0	0	0.8170
0	0	1.0000	0.1910
0	1.0000	0	-0.0060
0	0	0	1.0000

error twist  $V_b$ : (0.000, -2.356, 0.000, -0.269, 0.506, -1.653)

angular error  $||\omega_b||$ : 2.356140e+00

linear error  $||v_b||$ : 1.749618e+00

----- Iteration 2 -----

Joint Vector:

-2.0234 -0.8808 0.5450 1.8602 0.3327 -1.5243

SE(3) end-effector config:

0.4509	0.2923	0.8434	-0.0715
0.8926	-0.1450	-0.4270	-0.5734
-0.0025	0.9453	-0.3263	0.5148
0	0	0	1.0000

error twist  $V_b$ : (-0.329, -0.314, 0.055, -0.075, -0.053, -0.224)

angular error  $||\omega_b||$ : 4.584319e-01

linear error  $||v_b||$ : 2.424753e-01

----- Iteration 3 -----

Joint Vector:

-2.4616 -0.9278 0.6999 2.0109 -0.0018 -1.8565

SE(3) end-effector config:

0.7758	0.0560	0.6285	-0.3028
0.6267	0.0475	-0.7778	-0.4905
-0.0734	0.9973	0.0018	0.5378
0	0	0	1.0000

error twist  $V_b$ : (-0.002, 0.106, 0.074, -0.003, -0.038, 0.009)

angular error  $||\omega_b||$ : 1.288508e-01

linear error  $||v_b||$ : 3.911863e-02

----- Iteration 4 -----

Joint Vector:

-2.4450 -0.1825 2.6933 2.1767 0.0225 1.5956

SE(3) end-effector config:

0.7667	-0.0144	0.6419	-0.0280
0.6420	0.0173	-0.7665	-0.2724
-0.0001	0.9997	0.0225	-0.0609
0	0	0	1.0000

```
error twist V_b: (0.022, 0.088, 0.001, -0.355, 0.561, -0.009)
angular error ||omega_b||: 9.107370e-02
linear error    ||v_b||: 6.636733e-01
```

```
----- Iteration 5 -----
```

```
Joint Vector:
-2.5567 -0.8981 1.5668 1.3888 0.0050 -2.0562
```

```
SE(3) end-effector config:
0.8325 0.0014 0.5541 -0.3016
0.5541 -0.0044 -0.8325 -0.4288
0.0013 1.0000 -0.0044 0.2225
0 0 0 1.0000
```

```
error twist V_b: (-0.004, 0.198, -0.002, -0.044, 0.278, 0.056)
angular error ||omega_b||: 1.981935e-01
linear error    ||v_b||: 2.865519e-01
```

```
----- Iteration 6 -----
```

```
Joint Vector:
-2.4401 -0.5683 -2.1865 0.7770 0.0391 1.9780
```

```
SE(3) end-effector config:
0.7538 -0.0236 0.6567 0.0612
0.6571 0.0271 -0.7533 -0.1982
-0.0000 0.9994 0.0359 0.5061
0 0 0 1.0000
```

```
error twist V_b: (0.036, 0.068, 0.001, -0.470, -0.006, -0.026)
angular error ||omega_b||: 7.725728e-02
linear error    ||v_b||: 4.708463e-01
```

```
----- Iteration 7 -----
```

```
Joint Vector:
-2.6659 2.0593 2.3053 -1.0416 0.1226 2.9642
```

```
SE(3) end-effector config:
0.8274 -0.0147 0.5614 0.3768
0.5616 0.0167 -0.8272 -0.0201
0.0027 0.9998 0.0221 0.1775
0 0 0 1.0000
```

```
error twist V_b: (0.022, 0.189, -0.001, -0.828, 0.324, -0.058)
angular error ||omega_b||: 1.903799e-01
linear error    ||v_b||: 8.914120e-01
```

```
----- Iteration 8 -----
```

```
Joint Vector:
-2.7835 2.0239 -1.5581 2.2332 0.4205 -2.6976
```

SE(3) end-effector config:

0.7408	0.0919	0.6654	-0.0229
0.6708	-0.1528	-0.7257	-0.2049
0.0350	0.9840	-0.1748	-0.3977
0	0	0	1.0000

error twist  $V_b$ : (-0.175, 0.046, -0.039, -0.387, 0.905, -0.057)

angular error  $||\omega_b||$ : 1.851943e-01

linear error  $||v_b||$ : 9.855996e-01

----- Iteration 9 -----

Joint Vector:

-0.7726	1.5331	2.2916	-2.6164	-1.4299	-1.0245
---------	--------	--------	---------	---------	---------

SE(3) end-effector config:

-0.9497	-0.2732	-0.1533	-0.2063
0.2075	-0.9152	0.3456	0.3694
-0.2347	0.2964	0.9258	-0.0460
0	0	0	1.0000

error twist  $V_b$ : (0.956, -1.934, -1.228, -0.697, 0.817, 0.108)

angular error  $||\omega_b||$ : 2.482548e+00

linear error  $||v_b||$ : 1.079807e+00

----- Iteration 10 -----

Joint Vector:

0.4633	-0.1150	-1.2003	-2.4281	0.8305	2.6999
--------	---------	---------	---------	--------	--------

SE(3) end-effector config:

0.0651	-0.5294	-0.8459	0.3001
-0.7135	-0.6173	0.3314	0.3336
-0.6976	0.5820	-0.4180	0.5611
0	0	0	1.0000

error twist  $V_b$ : (-1.199, 2.284, -0.283, -0.305, 0.442, 1.227)

angular error  $||\omega_b||$ : 2.595300e+00

linear error  $||v_b||$ : 1.339520e+00

----- Iteration 11 -----

Joint Vector:

2.7046	0.0286	-2.8193	-1.9660	1.5606	-2.2459
--------	--------	---------	---------	--------	---------

SE(3) end-effector config:

0.9708	0.2357	-0.0445	-0.0152
0.2363	-0.9716	0.0095	-0.1141
-0.0410	-0.0197	-0.9990	0.1255
0	0	0	1.0000

error twist  $V_b$ : (-1.558, 0.458, -0.403, -0.386, 0.469, -0.160)

angular error  $||\omega_b||$ : 1.673139e+00

linear error  $||v_b||$ : 6.287374e-01

----- Iteration 12 -----

Joint Vector:

1.3960 2.7766 2.0358 -1.8135 0.0156 2.3248

SE(3) end-effector config:

-0.0893 -0.1312 -0.9873 -0.2529  
-0.5670 -0.8083 0.1587 -0.3337  
-0.8188 0.5740 -0.0022 0.4212  
0 0 0 1.0000

error twist  $V_b$ : (-1.182, 2.270, 0.380, -0.018, 0.134, 0.170)

angular error  $||\omega_b||$ : 2.587085e+00

linear error  $||v_b||$ : 2.16622e-01

----- Iteration 13 -----

Joint Vector:

0.9345 -0.0021 -0.5358 -2.4541 2.8877 2.4052

SE(3) end-effector config:

0.5116 0.5832 0.6310 0.4251  
0.3793 0.5056 -0.7749 0.6252  
-0.7710 0.6358 0.0374 0.3877  
0 0 0 1.0000

error twist  $V_b$ : (-0.010, 0.112, 0.882, -1.255, -0.468, 0.357)

angular error  $||\omega_b||$ : 8.893505e-01

linear error  $||v_b||$ : 1.386243e+00

----- Iteration 14 -----

Joint Vector:

0.8941 3.1010 2.9718 -3.0279 3.0173 3.0506

SE(3) end-effector config:

0.7177 0.0048 0.6963 -0.0595  
0.6963 -0.0120 -0.7176 -0.0299  
0.0050 0.9999 -0.0120 0.2472  
0 0 0 1.0000

error twist  $V_b$ : (-0.012, 0.015, -0.005, -0.501, 0.255, 0.165)

angular error  $||\omega_b||$ : 1.988532e-02

linear error  $||v_b||$ : 5.854349e-01

----- Iteration 15 -----

Joint Vector:

2.9593 -2.3959 1.7689 -0.9314 0.9778 -1.5461

SE(3) end-effector config:

-0.9866 -0.1192 -0.1114 -0.1274  
0.1611 -0.8210 -0.5477 -0.1339  
-0.0261 -0.5583 0.8292 0.6742

```
0          0          0      1.0000

      error twist V_b: (1.138, -1.181, -2.183, -0.437, 0.348, -0.175)
angular error ||omega_b||: 2.730631e+00
linear error   ||v_b||: 5.851866e-01

----- Iteration 16 -----
Joint Vector:
   -0.7165   -3.0231    2.8741   -1.0422    2.1769    0.1864

SE(3) end-effector config:
   0.5570   -0.8179   -0.1445    0.1004
   0.5859    0.5102   -0.6296   -0.0048
   0.5887    0.2661    0.7633    0.2248
       0         0         0      1.0000

      error twist V_b: (1.184, 0.367, -0.561, -0.513, 0.348, 0.368)
angular error ||omega_b||: 1.360609e+00
linear error   ||v_b||: 7.208779e-01

----- Iteration 17 -----
Joint Vector:
   -1.4429   -1.7944   -0.5886   -1.4828    2.9542    2.8414

SE(3) end-effector config:
   -0.0618   -0.1076   -0.9923   -0.0296
   -0.9143    0.4049    0.0130    0.4531
    0.4004    0.9080   -0.1234    0.8341
       0         0         0      1.0000

      error twist V_b: (0.433, 2.349, -0.345, 0.058, -0.398, 1.208)
angular error ||omega_b||: 2.413564e+00
linear error   ||v_b||: 1.273322e+00

----- Iteration 18 -----
Joint Vector:
    1.1450    0.0883    0.6344   -1.4966    3.1318   -0.4296

SE(3) end-effector config:
    0.3807   -0.1432    0.9135    0.2994
    0.8609   -0.3058   -0.4067    0.7255
    0.3376    0.9413    0.0068   -0.2751
       0         0         0      1.0000

      error twist V_b: (-0.056, -0.364, -0.342, -1.210, 1.003, 0.187)
angular error ||omega_b||: 5.025482e-01
linear error   ||v_b||: 1.582182e+00

----- Iteration 19 -----
Joint Vector:
    0.8984    0.4738    1.3190    0.5884   -3.0202    2.3857
```

SE(3) end-effector config:

0.5515	-0.0700	0.8312	0.1239
0.8342	0.0454	-0.5497	0.1999
0.0008	0.9965	0.0835	-0.4116
0	0	0	1.0000

error twist  $V_b$ : (0.083, -0.201, -0.009, -0.809, 0.908, 0.153)

angular error  $||\omega_b||$ : 2.177695e-01

linear error  $||v_b||$ : 1.225277e+00

----- Iteration 20 -----

Joint Vector:

0.2563	-0.6846	-0.4491	0.2202	-2.7584	-0.8867
--------	---------	---------	--------	---------	---------

SE(3) end-effector config:

0.9998	0.0143	0.0142	0.5252
0.0178	-0.2958	-0.9551	0.1717
-0.0094	0.9551	-0.2960	0.6306
0	0	0	1.0000

error twist  $V_b$ : (-0.289, 0.763, -0.106, -1.052, -0.068, 0.318)

angular error  $||\omega_b||$ : 8.230099e-01

linear error  $||v_b||$ : 1.101067e+00

----- Iteration 21 -----

Joint Vector:

0.2470	-2.9260	1.5947	-0.6935	2.8127	-2.0265
--------	---------	--------	---------	--------	---------

SE(3) end-effector config:

0.9944	-0.0488	0.0940	-0.2485
0.1041	0.2868	-0.9523	-0.0303
0.0195	0.9567	0.2903	0.6262
0	0	0	1.0000

error twist  $V_b$ : (0.290, 0.679, 0.082, -0.250, -0.188, 0.388)

angular error  $||\omega_b||$ : 7.426343e-01

linear error  $||v_b||$ : 4.980760e-01

----- Iteration 22 -----

Joint Vector:

1.8140	2.6828	2.2184	3.0066	2.6844	1.3910
--------	--------	--------	--------	--------	--------

SE(3) end-effector config:

-0.3112	0.3671	0.8766	0.0630
0.9261	0.3241	0.1930	-0.4009
-0.2132	0.8719	-0.4408	0.2548
0	0	0	1.0000

error twist  $V_b$ : (-0.299, -1.034, 0.445, -0.241, 0.137, -0.380)

angular error  $||\omega_b||$ : 1.164658e+00



```
linear error      ||v_b||: 4.701491e-01

----- Iteration 23 -----
Joint Vector:
    1.1198   -3.0559    1.4281   -2.2562   -3.0826    2.2250

SE(3) end-effector config:
    0.3966    0.0330    0.9174   -0.2451
    0.9013    0.1756   -0.3960   -0.4440
   -0.1741    0.9839    0.0399    0.5900
         0         0         0     1.0000

      error twist V_b: (0.072, -0.373, 0.166, -0.070, -0.096, -0.017)
angular error ||omega_b||: 4.148192e-01
linear error      ||v_b||: 1.199673e-01

----- Iteration 24 -----
Joint Vector:
    1.0982   -2.6680    1.5790   -0.5425    2.9319   -1.6325

SE(3) end-effector config:
    0.4666   -0.1840    0.8651   -0.0724
    0.8845    0.0966   -0.4565   -0.0784
    0.0004    0.9782    0.2078    0.6530
         0         0         0     1.0000

      error twist V_b: (0.208, -0.299, -0.032, -0.478, -0.157, 0.051)
angular error ||omega_b||: 3.653000e-01
linear error      ||v_b||: 5.055024e-01

----- Iteration 25 -----
Joint Vector:
    1.8201    2.0082    3.0829    0.9642    3.0769   -0.3038

SE(3) end-effector config:
   -0.3053   -0.0373    0.9515   -0.0242
    0.9492    0.0681    0.3073   -0.0149
   -0.0762    0.9970    0.0146   -0.0231
         0         0         0     1.0000

      error twist V_b: (0.055, -1.097, 0.060, -0.582, 0.504, -0.151)
angular error ||omega_b||: 1.099644e+00
linear error      ||v_b||: 7.850997e-01

----- Iteration 26 -----
Joint Vector:
   -1.4306    0.1094   -2.7629    0.0055    1.1356   -2.5848

SE(3) end-effector config:
   -0.7713    0.5582    0.3058    0.1500
   -0.0435   -0.5256    0.8496   -0.0351
```

0.6350	0.6421	0.4296	0.3453
0	0	0	1.0000

error twist V\_b: (-0.513, -2.029, -0.932, -0.275, 0.383, -0.691)  
angular error ||omega\_b||: 2.290666e+00  
linear error ||v\_b||: 8.364298e-01

----- Iteration 27 -----

Joint Vector:

-1.7980	-1.1991	-2.1934	-0.0386	-0.5340	-3.0289
---------	---------	---------	---------	---------	---------

SE(3) end-effector config:

0.6846	-0.0127	0.7288	0.2228
0.7160	0.1989	-0.6692	0.1666
-0.1364	0.9799	0.1453	0.4906
0	0	0	1.0000

error twist V\_b: (0.148, -0.032, 0.135, -0.842, -0.055, 0.087)  
angular error ||omega\_b||: 2.032438e-01  
linear error ||v\_b||: 8.480546e-01

----- Iteration 28 -----

Joint Vector:

-0.4238	1.1661	2.8426	-0.1961	-1.8666	2.3627
---------	--------	--------	---------	---------	--------

SE(3) end-effector config:

0.0299	0.8259	0.5631	0.0662
0.7334	0.3646	-0.5737	0.0635
-0.6791	0.4301	-0.5948	0.0229
0	0	0	1.0000

error twist V\_b: (-0.586, -0.312, 0.968, -0.851, 0.134, -0.088)  
angular error ||omega\_b||: 1.173596e+00  
linear error ||v\_b||: 8.663674e-01

----- Iteration 29 -----

Joint Vector:

-1.6844	2.3914	1.4661	2.6226	-2.8858	2.0034
---------	--------	--------	--------	---------	--------

SE(3) end-effector config:

0.1304	0.3352	-0.9331	0.1027
0.2067	0.9112	0.3563	0.6381
0.9697	-0.2393	0.0495	-0.0326
0	0	0	1.0000

error twist V\_b: (2.223, 1.722, -0.430, -0.043, -0.520, 1.713)  
angular error ||omega\_b||: 2.844871e+00  
linear error ||v\_b||: 1.790849e+00

----- Iteration 30 -----

Joint Vector:

1.1216    0.4270    -1.3196    2.5700    -1.4303    2.6626

SE(3) end-effector config:

-0.5983	-0.7972	-0.0803	0.1290
0.7825	-0.6029	0.1558	0.5450
-0.1726	0.0303	0.9845	0.3091
0	0	0	1.0000

error twist  $V_b$ : (1.362, -1.250, -0.992, -1.063, 0.571, -0.072)

angular error  $||\omega_b||$ : 2.098092e+00

linear error  $||v_b||$ : 1.208741e+00

----- Iteration 31 -----

Joint Vector:

0.1143    2.0602    0.4815    -0.3669    -3.0600    2.5924

SE(3) end-effector config:

0.8986	-0.4087	0.1596	-0.5969
0.1731	-0.0041	-0.9849	-0.0411
0.4032	0.9126	0.0670	-0.4480
0	0	0	1.0000

error twist  $V_b$ : (0.194, 0.601, -0.381, 0.238, 0.892, 0.625)

angular error  $||\omega_b||$ : 7.379325e-01

linear error  $||v_b||$ : 1.114968e+00

----- Iteration 32 -----

Joint Vector:

1.0643    -2.0437    -1.6310    2.1645    3.0955    -1.5254

SE(3) end-effector config:

0.4833	-0.0330	0.8749	-0.2353
0.8754	0.0355	-0.4822	-0.3682
-0.0152	0.9988	0.0460	0.2661
0	0	0	1.0000

error twist  $V_b$ : (0.048, -0.281, 0.009, -0.146, 0.232, 0.033)

angular error  $||\omega_b||$ : 2.854392e-01

linear error  $||v_b||$ : 2.762801e-01

----- Iteration 33 -----

Joint Vector:

1.1157    -2.8843    -1.6099    2.1107    -3.1240    -2.3848

SE(3) end-effector config:

0.4280	0.0114	0.9037	-0.2131
0.9038	-0.0041	-0.4280	-0.3739
-0.0012	0.9999	-0.0121	-0.1176
0	0	0	1.0000

error twist  $V_b$ : (-0.012, -0.343, 0.003, -0.155, 0.617, -0.002)

```
angular error ||omega_b||: 3.432742e-01
linear error    ||v_b||: 6.365098e-01
```

```
----- Iteration 34 -----
```

```
Joint Vector:
```

```
1.1318    0.0275   -0.9335   -0.5000    2.8900   -1.4060
```

```
SE(3) end-effector config:
```

```
0.3877   -0.2245    0.8940    0.2978
0.9218    0.0997   -0.3747    0.7039
-0.0050    0.9694    0.2456    0.3904
0          0          0        1.0000
```

```
error twist V_b: (0.246, -0.386, -0.043, -1.339, 0.094, 0.190)
```

```
angular error ||omega_b||: 4.596383e-01
linear error    ||v_b||: 1.356193e+00
```

```
----- Iteration 35 -----
```

```
Joint Vector:
```

```
0.8566    2.1257   -0.9942   -2.8482   -3.1324   -1.6824
```

```
SE(3) end-effector config:
```

```
0.6539   -0.0156    0.7565    0.0038
0.7558   -0.0319   -0.6540    0.0456
0.0343    0.9994   -0.0091   -0.6139
0          0          0        1.0000
```

```
error twist V_b: (-0.010, -0.072, -0.034, -0.587, 1.125, 0.144)
```

```
angular error ||omega_b||: 8.061524e-02
linear error    ||v_b||: 1.277174e+00
```

```
----- Iteration 36 -----
```

```
Joint Vector:
```

```
2.9433    0.0908   -2.8545   -1.5797   -2.5404    1.9206
```

```
SE(3) end-effector config:
```

```
-0.9972   -0.0652   -0.0375    0.0046
0.0027   -0.5289    0.8487   -0.0431
-0.0752    0.8462    0.5276    0.2726
0          0          0        1.0000
```

```
error twist V_b: (0.358, -2.298, -0.619, -0.329, 0.419, -0.483)
```

```
angular error ||omega_b||: 2.406548e+00
linear error    ||v_b||: 7.191852e-01
```

```
----- Iteration 37 -----
```

```
Joint Vector:
```

```
1.2684   -0.5438    1.0210    0.6390   -2.5458    0.7606
```

```
SE(3) end-effector config:
```

```
0.6510   -0.2501    0.7167    0.1413
```

```

    0.7215    0.4974   -0.4818    0.5911
   -0.2360    0.8307    0.5042    0.1285
         0         0         0    1.0000

```

```

    error twist V_b: (0.549, -0.115, 0.218, -1.142, 0.121, 0.475)
angular error ||omega_b||: 6.017699e-01
linear error    ||v_b||: 1.243204e+00

```

```
----- Iteration 38 -----
```

```
Joint Vector:
```

```

    1.4779    2.1651   -0.0835   -2.0927   -2.7489   -0.0597

```

```
SE(3) end-effector config:
```

```

    0.4659    0.0268    0.8844   -0.0757
    0.8835    0.0418   -0.4666   -0.4549
   -0.0495    0.9988   -0.0042   -0.7004
         0         0         0    1.0000

```

```

    error twist V_b: (0.003, -0.300, 0.050, -0.200, 1.196, -0.154)
angular error ||omega_b||: 3.040574e-01
linear error    ||v_b||: 1.222130e+00

```

```
----- Iteration 39 -----
```

```
Joint Vector:
```

```

    1.0537   -0.9094   -0.7859    1.7113   -2.8735    0.0132

```

```
SE(3) end-effector config:
```

```

    0.7069   -0.0015    0.7073    0.0675
    0.7073    0.0045   -0.7069    0.1792
   -0.0022    1.0000    0.0042    0.7187
         0         0         0    1.0000

```

```

    error twist V_b: (0.004, -0.000, 0.002, -0.740, -0.220, 0.220)
angular error ||omega_b||: 4.768190e-03
linear error    ||v_b||: 8.026123e-01

```

```
----- Iteration 40 -----
```

```
Joint Vector:
```

```

    0.9740   -0.5161    2.7541   -2.2333   -2.9531    0.0048

```

```
SE(3) end-effector config:
```

```

    0.7071   -0.0008    0.7071    0.0390
    0.7071    0.0004   -0.7071    0.1080
    0.0003    1.0000    0.0009   -0.1041
         0         0         0    1.0000

```

```

    error twist V_b: (0.001, -0.000, -0.000, -0.670, 0.604, 0.190)
angular error ||omega_b||: 9.037095e-04
linear error    ||v_b||: 9.217504e-01

```

```
----- Iteration 41 -----
```

Joint Vector:

0.4918 -0.6001 -1.0820 1.6938 2.8480 0.0119

SE(3) end-effector config:

0.7071 0.0019 0.7071 0.2763  
0.7071 -0.0029 -0.7071 0.1826  
0.0007 1.0000 -0.0034 0.6233  
0 0 0 1.0000

error twist  $V_b$ : (-0.003, 0.000, -0.001, -0.890, -0.123, 0.075)

angular error  $||\omega_b||$ : 3.457515e-03

linear error  $||v_b||$ : 9.018477e-01

----- Iteration 42 -----

Joint Vector:

-0.5843 -0.5538 2.6808 -2.1686 1.7719 -0.0435

SE(3) end-effector config:

0.7079 -0.0039 0.7063 0.2502  
0.7055 0.0537 -0.7067 -0.0545  
-0.0351 0.9986 0.0408 -0.1120  
0 0 0 1.0000

error twist  $V_b$ : (0.041, 0.001, 0.035, -0.715, 0.601, -0.061)

angular error  $||\omega_b||$ : 5.383302e-02

linear error  $||v_b||$ : 9.358911e-01

----- Iteration 43 -----

Joint Vector:

1.5222 -1.4922 -1.2765 2.8042 -2.4003 0.1773

SE(3) end-effector config:

0.6994 -0.1236 0.7039 -0.0674  
0.6987 -0.0893 -0.7099 -0.3876  
0.1506 0.9883 0.0239 0.5625  
0 0 0 1.0000

error twist  $V_b$ : (0.024, 0.002, -0.151, -0.248, -0.043, -0.085)

angular error  $||\omega_b||$ : 1.530570e-01

linear error  $||v_b||$ : 2.660240e-01

----- Iteration 44 -----

Joint Vector:

0.8560 -1.8644 -1.1571 3.0481 -3.0727 0.0356

SE(3) end-effector config:

0.7059 -0.0077 0.7083 -0.3616  
0.7083 -0.0051 -0.7059 -0.3752  
0.0091 1.0000 0.0018 0.4479  
0 0 0 1.0000

```

        error twist V_b: (0.002, -0.002, -0.009, -0.045, 0.052, 0.132)
angular error ||omega_b||: 9.428401e-03
linear error    ||v_b||: 1.486420e-01

```

```
----- Iteration 45 -----
```

```
Joint Vector:
```

```
    1.1054   -1.9785   -0.8722    2.7540   -2.8217   -0.0969
```

```
SE(3) end-effector config:
```

```
    0.7059    0.0251    0.7079   -0.2794
    0.7083   -0.0178   -0.7057   -0.4869
   -0.0051    0.9995   -0.0304    0.4945
         0         0         0    1.0000
```

```

        error twist V_b: (-0.030, -0.002, 0.005, -0.024, 0.005, -0.005)
angular error ||omega_b||: 3.082948e-02
linear error    ||v_b||: 2.497565e-02

```

```
----- Iteration 46 -----
```

```
Joint Vector:
```

```
    1.0821   -2.0257   -0.7934    2.8122   -2.8463   -0.0073
```

```
SE(3) end-effector config:
```

```
    0.7061    0.0019    0.7081   -0.3001
    0.7081   -0.0010   -0.7061   -0.4993
   -0.0007    1.0000   -0.0020    0.4999
         0         0         0    1.0000
```

```

        error twist V_b: (-0.002, -0.001, 0.001, -0.000, 0.000, 0.001)
angular error ||omega_b||: 2.520669e-03
linear error    ||v_b||: 7.341997e-04

```

```
----- Iteration 47 -----
```

```
Joint Vector:
```

```
    1.0829   -2.0248   -0.7948    2.8196   -2.8441    0.0001
```

```
SE(3) end-effector config:
```

```
    0.7071   -0.0000    0.7071   -0.3000
    0.7071    0.0000   -0.7071   -0.5000
    0.0000    1.0000    0.0000    0.5000
         0         0         0    1.0000
```

```

        error twist V_b: (0.000, -0.000, -0.000, -0.000, -0.000, -0.000)
angular error ||omega_b||: 1.690179e-05
linear error    ||v_b||: 3.227473e-06

```

```
theta_vec =
```

```
    1.0829
   -2.0248
```

```
-0.7948  
 2.8196  
-2.8441  
 0.0001
```

```
>>
```