1. MBD states/controls initialized using data; Step length bounded to 2.47 m
   1. Symmetry constraints inequalities - 0.2
   2. \_CONS\_02
   3. Upper arm internal rotation upper bound = 0 degrees
   4. Lower arm pronation upper bound = 90 degrees
   5. Tolerance = 1e-5
2. Used solution from 1.
   1. Symmetry constraints inequalities - 0.1
   2. \_CONS\_01
   3. Upper arm internal rotation upper bound = 0 degrees
   4. Lower arm pronation upper bound = 90 degrees
   5. Tolerance = 1e-5
3. Used solution from 2.
   1. Symmetry constraints inequalities - 0.05
   2. \_CONS\_005
   3. Upper arm internal rotation upper bound = 0 degrees
   4. Lower arm pronation upper bound = 90 degrees
   5. Tolerance = 1e-5
4. Used solution from 3.
   1. Symmetry constraints inequalities - 0.005
   2. \_CONS\_0005
   3. Upper arm internal rotation upper bound = 0 degrees
   4. Lower arm pronation upper bound = 90 degrees
   5. Tolerance = 1e-5
5. Used solution from 4.
   1. Symmetry constraints inequalities - 0.0005
   2. \_CONS\_00005
   3. Upper arm internal rotation upper bound = 0 degrees
   4. Lower arm pronation upper bound = 90 degrees
   5. Tolerance = 1e-5
6. Used solution from 5.
   1. Symmetry constraints enforced
   2. \_CONS
   3. Upper arm internal rotation upper bound = 0 degrees
   4. Lower arm pronation upper bound = 90 degrees
   5. Tolerance = 1e-5
7. Used solution from 5.
   1. Symmetry constraints enforced
   2. \_CONS\_BS\_PUSH
   3. Upper arm internal rotation upper bound = 0 degrees
   4. Lower arm pronation upper bound = 90 degrees
   5. Tolerance = 1e-5
   6. *Bound\_slack and slack\_bound\_push* enabled
8. Used solution from 5.
   1. Symmetry constraints enforced
   2. \_CONS\_BS\_PUSH\_FRAC
   3. Upper arm internal rotation upper bound = 0 degrees
   4. Lower arm pronation upper bound = 90 degrees
   5. Tolerance = 1e-5
   6. *Bound\_slack and slack\_bound\_push and fraction* enabled
9. Used solution from 8. Check if there is scope to improve solution
   1. Symmetry constraints enforced
   2. \_CONS\_CHECK
   3. Upper arm internal rotation upper bound = 0 degrees
   4. Lower arm pronation upper bound = 90 degrees
   5. Tolerance = 1e-5
   6. *Bound\_slack and slack\_bound\_push and fraction* disabled
10. Used solution from 8. Check if there is scope to improve solution
    1. Symmetry constraints enforced
    2. \_CONS\_CHECK\_OPTS
    3. Upper arm internal rotation upper bound = 0 degrees
    4. Lower arm pronation upper bound = 90 degrees
    5. Tolerance = 1e-5
    6. *Bound\_slack and slack\_bound\_push and fraction* enabled
11. Used solution from 9. Check if there is scope to improve solution
    1. Symmetry constraints enforced
    2. \_CONS\_CHECK2
    3. Upper arm internal rotation upper bound = 0 degrees
    4. Lower arm pronation upper bound = 90 degrees
    5. Tolerance = 1e-5
    6. *Bound\_slack and slack\_bound\_push* enabled
12. Solution 9 was the best in terms of speed; so used that as the initial guess for all perturbation simulations
    1. Symmetry constraints enforced
    2. \_HTD\_X\_X or IKTD\_X\_X
    3. Upper arm internal rotation bound = 0 degrees
    4. Lower arm pronation upper bound = 90 degrees
    5. Tolerance = 1e-5
    6. *Bound\_slack and slack\_bound\_push and fraction* disabled
13. Reperformed all of the perturbation simulations using the optimal solutions identified for each perturbation simulation as the initial guess
    1. Symmetry constraints enforced
    2. \_HTD\_X\_X or IKTD\_X\_X with CHECK2\_1
    3. Upper arm internal rotation bound = 0 degrees
    4. Lower arm pronation upper bound = 90 degrees
    5. Tolerance = 1e-5
    6. *Bound\_slack and slack\_bound\_push and fraction* disabled

***April 8th 2024: Checked the code to reproduce Case 9 (\_CONS\_CHECK) using ‘predictiveSprintingSimulations\_v4.m’… all seems good… this file is saved as:\_CONS\_CHECK\_CHECK***