Recent two weeks

• Finished implementing improved collision detection and updated the ST25D time stepper with the NCP formulation to handle general contact pairs (1 to n edges)
  – Radius of detecting the contact pair is a parameter need to be tuned
  – Tested using our round-finger pushing simulation
    • Worked as expected
    • Difference not very obvious in video, thereby zoomed screenshots are attached
Recent two weeks

• Implemented Singular Value Decomposition in dvc2D (Greatly benefited from LAPACK implementation in Fortran and Numerical Recipes)
  – Most matrix Libraries depend on BLAS/LAPACK, a heavy burden on compiling, need Fortran compiler. If with prebuilt libraries, then can’t be compatible with Windows/Linux at the same time
  – Other BLAS/LAPACK-independent C/C++ matrix libraries only produce “economic” decomposition which is not enough for calculating the null-space and most are too heavy for DVC usage
  – SVD result tested and verified against MATLAB
Recent two weeks

• Implemented General Support Point in ST25D with NCP
  – Tested using couch pushing simulation
Recent two weeks

• General Support Point (continued)
  – User can specify expected force distribution or just part of the distribution or not
    Say four support points, user can specify as (0.2 0.2 0.3 0.3) or (0.2 0 0.3 0) or doesn’t specify
    – If not specified, a solution will be provided
    – If the number of effectively specified distribution is bigger than the dimension of the nullspace (here is 4-3 = 1), then it’s possible that there’s no solution, exception will be thrown out
    – Otherwise, a solution will be always worked out
Problem

The implementation is only done with ST25DNCP. If the user specify more than 3 support points, then original ST25D won’t work.

Whole implementation need to be tested against more complex situations.
Recent two weeks

- Study filtering
  - Starting from kalman filtering, implemented a simple one in MATLAB
Next work

• Focus on filtering study
• Polish the implementations