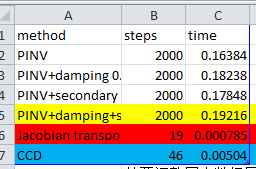
# Report

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The goal of this project is to realize three links planar Inverse Kinetics (IK) function with three different algorithms PINV, Jacobian transpose and CCD respectively. For application, I design a mini game to eliminate balloons to appy IK. In the interface, I set signal button to choose algorithm by users according to their interests. Besides, I set check box to optimize PINV algorithm.

About the operation of the game , right clcik on any position in the axis, the linkage will move to the clicked position. If the clcked position is within the ballon, the ballon and the thread fastens it will be eliminated. The whole program is implemented with matlab.

About the methods, three algorithms were tested according to the tutorial of the course. For PINV, the performace of damping and secondary task are also tested. Some numerical experiments were carried out to analyse these three algorithms, more details are shown in



According to the reuslts from the numerical experiments, the conclusions are as follows :

* For PINV algorithm, two factors affact its accuracy and computaion efficiency , that is, dumping data and steps m value. According to the damping factor data shown in Table2, the parameter value set as 0.2 is perfect for accuracy and time consumation. According to the m(step) factor data shown in Table 3, more steps means more accuracy while more time consumation.
* PINV +damping+secondary takes more computation time than only PINVshown in Talbe 1, however, according to Table 4, the sum  is smaller than only PINV algorithm, which means PINV+damping+secondary route is a more optimal path.
* For Jacobian transpose and CCD algorithm, CCD algorithm takes more time than Jacobian transpose shown in Table 1, and the sum of is larger than Jacobian transponse shown in Table 4, which means Jacobian transponse is optimization than CCD. The sum is smaller in Jacobian transponse, which means the motion is more smooth , and the computation time is smaller than other algorithm.

**So, we get a conclustion according to what we have discussed above, in our case, Jacobian transponse is the best method.**