

## Matlab-based Simulation of Press Device Motion

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### Abstract

With the development of science and technology and mathematics, Matlab can not only perform simple mathematical analysis and image processing, but also can achieve kinematics simulation, and through the program using Matlab can get the desired kinematic analysis curve, simple and direct, so this article A kinematics simulation was performed on a stamping device to make everyone aware of the application of Matlab in kinematics.

### Keywords

Matlab; motion analysis;

### 1. Introduction

In recent years, Matlab/Simulink has been widely applied and developed in kinematics, and its functions have been continuously improved. [1] The xml file can be modeled by other three-dimensional modeling software, and then Simulink simulation in Matlab can be used to perform the kinematics simulation of this stamping device. In this paper, a Matlab kinematics simulation of a stamping device is performed to make everyone understand the relevant knowledge.

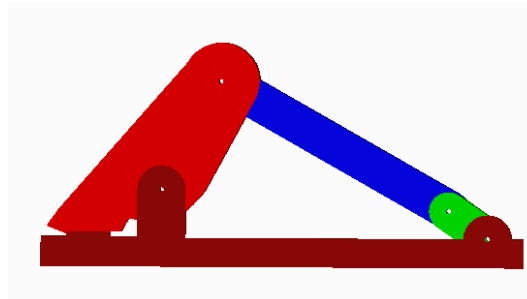


Fig.1 Stamping device

The xml file that Matlab can call is generated by the plug-in in creo, and the plug-in generates the first-generation simulation model and the second-generation simulation model file in the Export under the tool menu.

## 2. Matlab First Generation Simulation

### 2.1 Section Headings.

Set the current file location of matlab to the location of the above xml model, and input `mech_import` ('first-generation simulation model name') in the matlab command window to start the first-generation simulation. For the automatically generated model, you can first Run to see if the coordinates and gravity settings of the pair correspond, if not, modify it. Correspondingly, set the gravity in the model to `[0 0 -9.81]`. Add the input and output modules for the model below. The input module uses the motion input and the input signal is the same as the motor input type in Creo. [2] The final modified model is shown in the figure. 2 shows. Figure 3 shows the animation after the model is run.

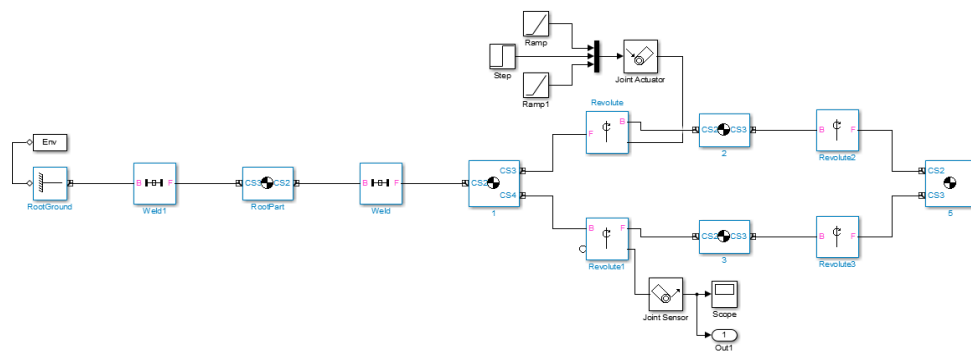


Fig.2 Modify the model

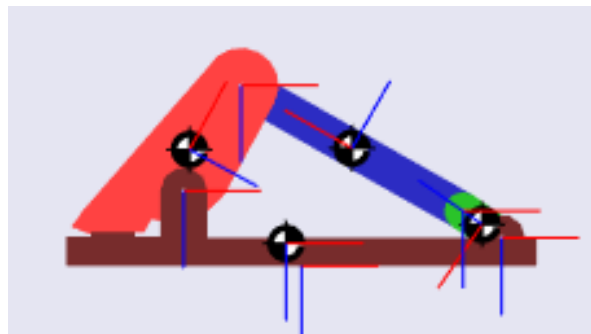


Fig.3 Animation of model run

Enter the following program in the command window

```
Subplot (121)
```

```
Plot(tout,yout(:,1));grid
```

```
Subplot (122)
```

```
Plot(tout,yout(:,2),'k-');grid
```

Generate the head displacement and speed curve, as shown in Figure 4:

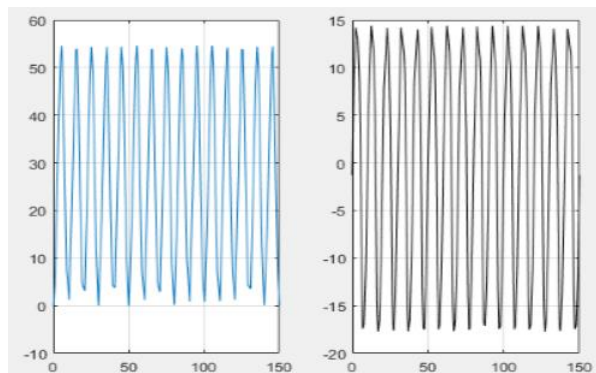


Fig.4 Press head displacement and speed curve

### 3. Second Generation Simulation of Matlab

Using the second generation of SimMechanics to verify the simulation results, first import smimport ('the name of the second generation model') in the matlab command window, enter to get the model, the same we first view the model position, set the input and output for the model The input of the module and model is still the same as that of the previous model, and the output is the same as the center displacement and speed of the forging hammer and the hinge of the rack.[3] The final model is shown in Fig. 5, and then it runs. [4] Then input the same program as the first generation simulation to generate displacement and velocity plots for the stamping head, as shown in Figure 6.

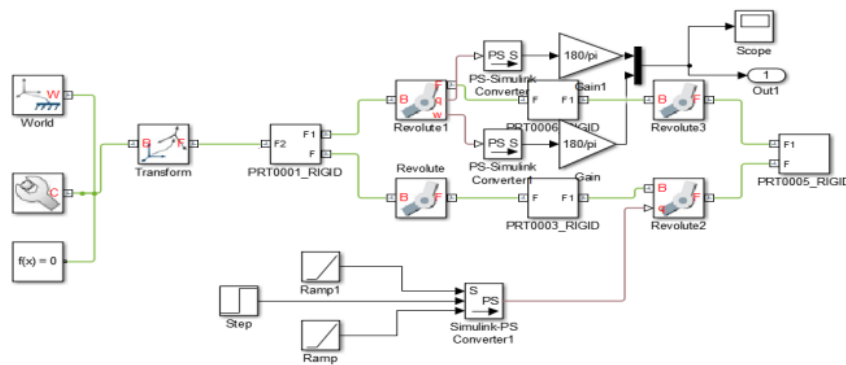


Fig.5 Final model

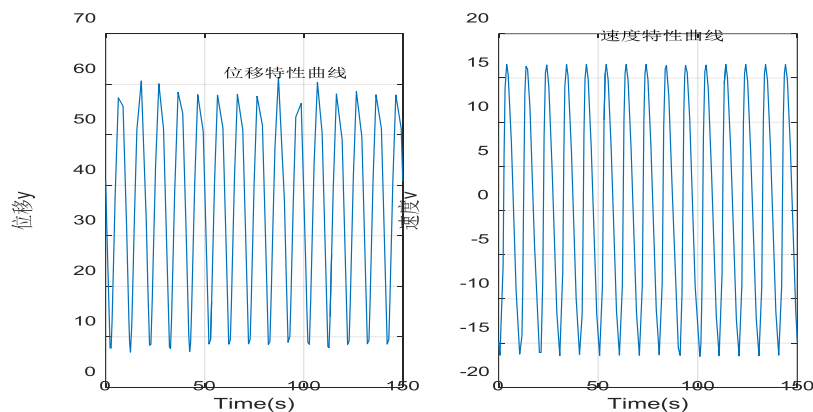


Fig.6 Press head displacement and speed curve

By comparing with the above figure, we can find that ignoring the difference in the initial value of the displacement, the maximum displacement and the change trend of the displacement are consistent, and the speed map is consistent. Therefore, it is considered that the motion simulation is successful.

#### 4. Conclusion

In this article, a kinematics simulation of Matlab is performed for a stamping mechanism, which enables us to understand the co-simulation of Matlab and other modeling software and some functions of Matlab.

#### References

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