project1

ME-6021 SCIENTIFIC COMPUTING

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1.Abstract

The purpose of this project is to determine whether it is the force that caused the chip to malfuntion,that is whether strain will be larger than 0.0001,the answer is Yes.

2.Development of mathematical model

There are two forces,so the whole chip is divided into 4 parts,-A<x<-B,-B<x<0,0<x<B,B<x<A.I need to compute u,so I integrate the equation 4 times,now I have:

u = a0+a1x+a2x^2+a3x^3; -A<x<-B

u = b0+b1x+b2x^2+b3x^3; -B<x<0

u = c0+c1x+c2x^2+c3x^3; 0<x<B

u = d0+d1x+d2x^2+d3x^3; B<x<A

There are 4 boundary conditions,equation3,4, and 5 fromProject paper,I need 12 more equations to compute a0,a1,...,d3 in order to know the value of u.

To take a look at the points when x = -B,0,B,which could get the 12 equations by applying the physical properties at those points and do some computations.

Then putting those 16 equations into one matrix and let matlab calculate a0,a1,...,d3.And then plot the displacement and put the value of u into (6) to plot the strain.
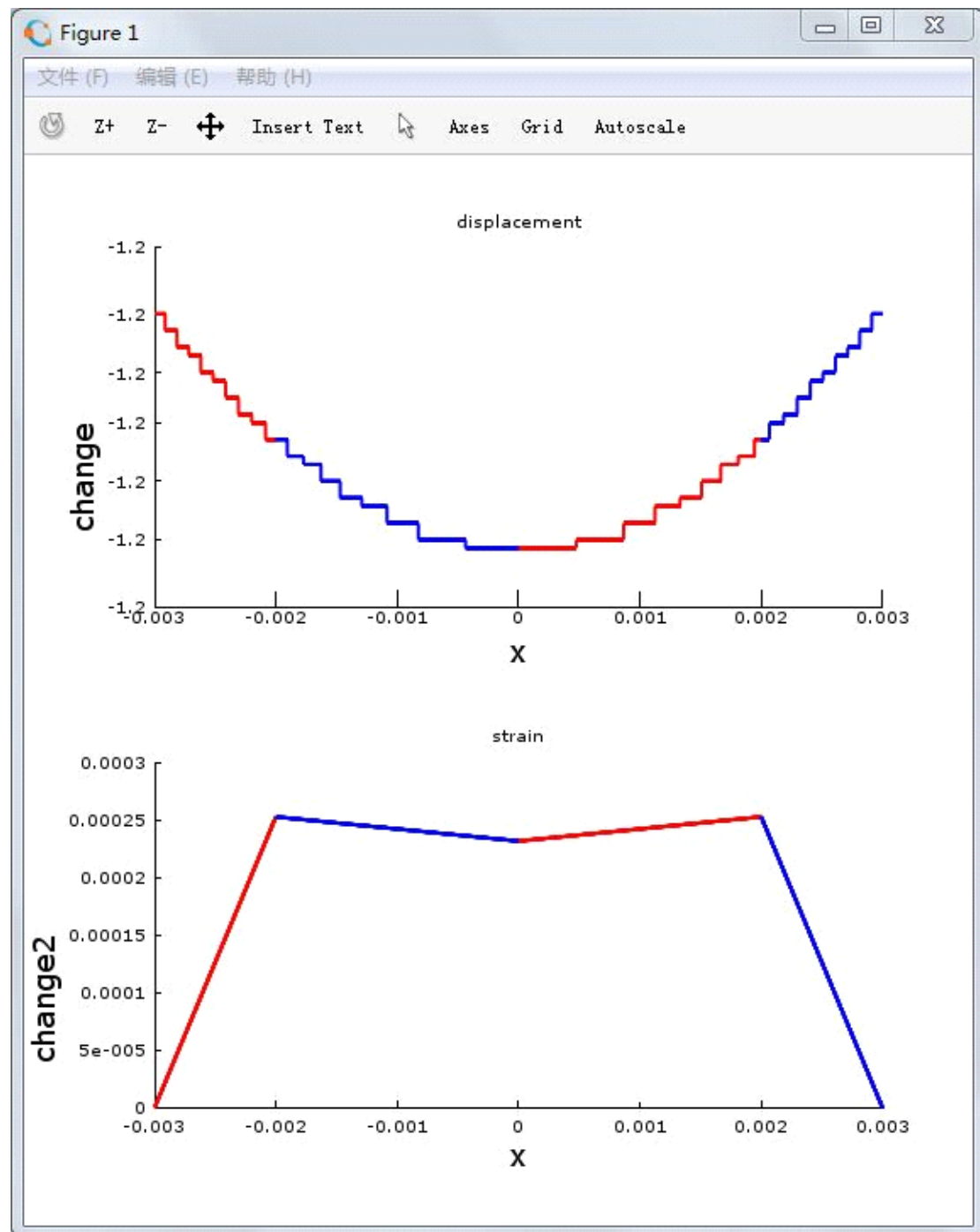
3.Results

Fig. 1 the displacement and strain of silicon chip

The figure of displacement is a smooth curve,and the figure of strain has 4 parts,each of which is a straight line.

4.Conclusion

It is found that it is the force that causes the chip to malfuntion.

5.Reference

1.   MATHWORKS,   2015   Retrieve
from: http://uk.mathworks.com/help/control/linear-algebra-for-control-design.html
2. MATHWORKS, 2015 Retrieve
from: http://uk.mathworks.com/help/symbolic/mupad_ref/matrix.html?searchHighlight=MATRIX

3. UL, 2015 Retrieve
from: http://www3.ul.ie/wlee/ms6021_worksheet05.pdf