



C.N.C parameterized programming

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Introduction

Programming in numerical control a machine is possible in relation to the triorthogonal test right of reference, chosen by the programmer, called "initial OP program" with initial origin dotted in relation to care is defined the elevations of the characteristic points of sculpting trajectories.

It can be said that an equipment is numerically controlled if the instructions that allow the commissioning of the machine are transmitted and this in coded form. This definition then the first machine tool with numerical control was the machine of Jacquard fabric (1800) with a perforated band as the program carrier.

Code for milling semisphere (Fig. 1)

In figure 1 it is presented a CNC program for milling a semisphere. The program is mate for FANUC equipment. The simulation of the program is presented in figure 2.

```
N10 T1 M6;

N20 #1=40 (RAZA SFEREI);
N30 #2=5 (RAZA SFEREI REZEI);
N40 #3=1 (INCREMENT UNGHIULAR LA R
SFERA);
N50 #4=0 (UNGI DE PORNIRE);

N60 #5=#1+#2;
N70 #6=#5*SIN[#4] (COTA PE X LA PORNIRE);
N80 G0 G54 G80 G90 X#6 Y0 S1500 M3;
N90 G0 G43 Z50 H0;
(SALT)
N100 #6=#5*SIN[#4] (COTA PE X / LA C.S.);
N110 #7=#5*COS[#4] (COTA PE Z / LA C.S.);
```

Figure 1. The parameterized CNC program for hemisphere

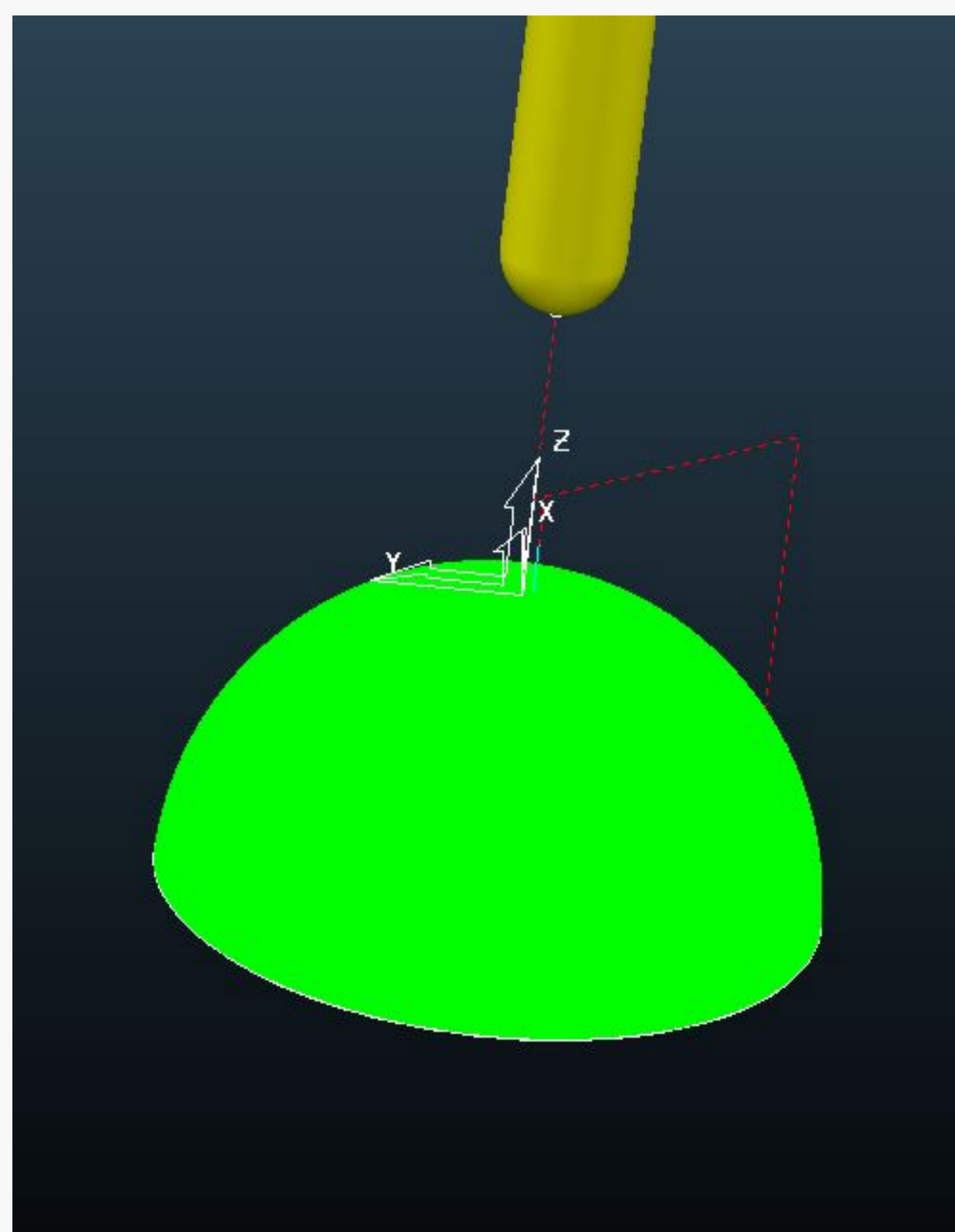


Figure 2. The simulation of the parameterized CNC program for hemisphere

In figure 3 is presented a CNC parameterized program for helical milling, and in figure 4 is presented the tool path after the simulation the CNC program

```
N20 G54 G80 G90 G17 S6000 M3 ;
N30 X25 Y35 ;
N40 G43 Z75 H0 ;
N50#1=0 (PRIMA COTA PE Z) ;
N60#2=-17.5 (ULTIMA COTA PE Z) ;
N70#3=4 (DIAMETRU DE PRELUCRAT) ;
N80#10=0 (REGISTRU CORECTIE DE RAZA) ;
N90#12=1 (=0 NU FACE LAMARE LA FUND) ;
(=1 FACE LAMARE LA FUND) ;
N100#14=0.2 (PAS PE Z) ;
N110#17=600 (AVANS INTRARE) ;
N120#18=200 (AVANS DE LUCRU) ;
N130#15=#1 ;
N140#4=#3 /2;
N150 G1 Z#15 F2000 ;
```

Figure 3. The parameterized CNC program for helical milling

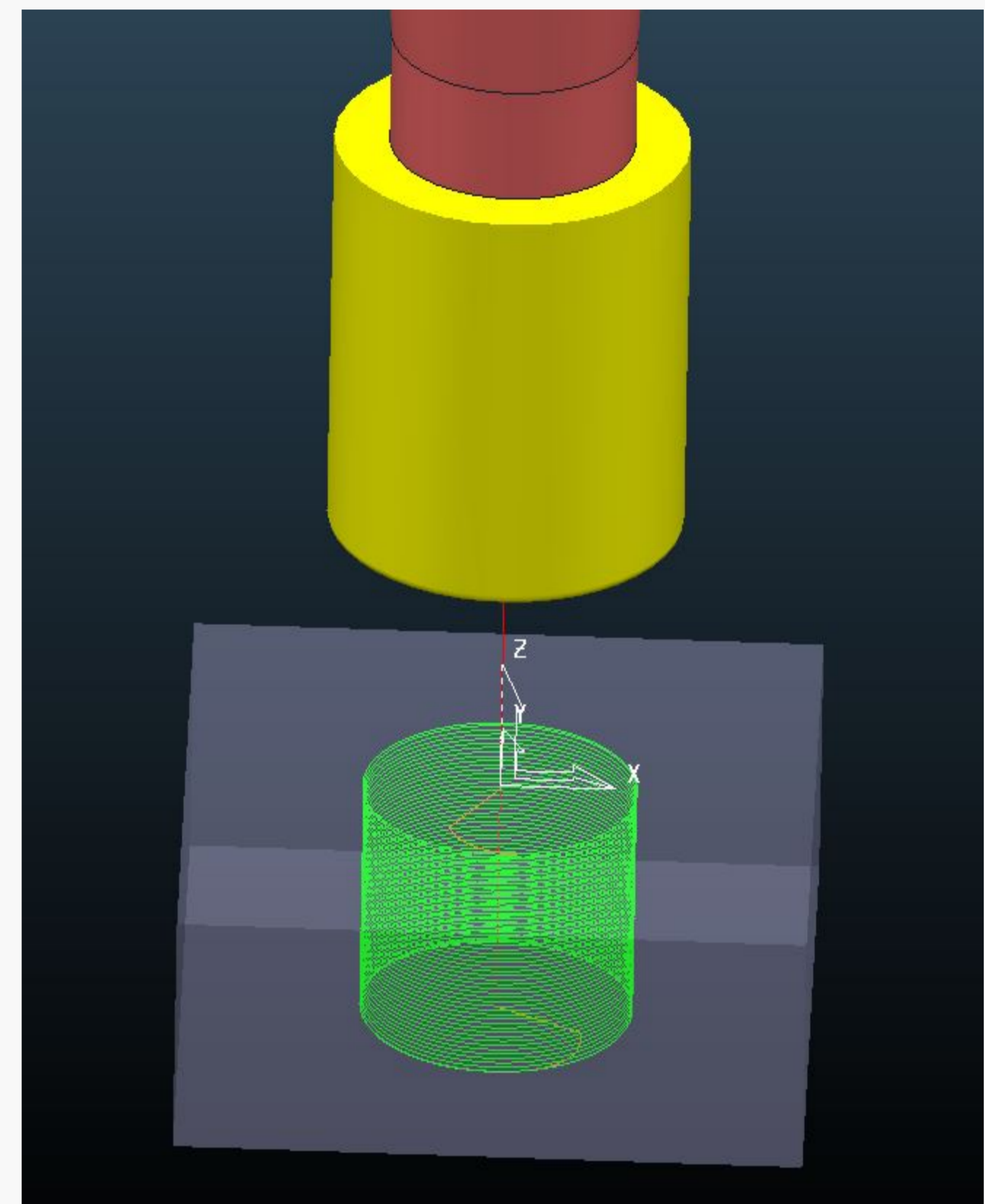


Figure 4. The simulation of the parameterized CNC program for helical milling.

In figure 5 is presented a CNC parameterized program for spiral milling, and in figure 5 is presented the tool path after the simulation the CNC program

```
N20 18 D1 M6
N30 S2000 M3
N33 R13=0.5; ADAOS PENTRU CERCUL FINAL
N40 R1=40; RAZA FINALA BUZUNAR
N40 R2=0; RAZA INITITALA
N50 R3=15; NUMARUL DE ROTATII PENTRU PRELUCRAREA BUZUNARULUI
N60 R4=5; INCREMENTUL DE UNGHI
N70 R5=(R1-R2-R13)/R3 ; PASUL SPIRALEI
N80 R6=R3*360; UNGHIUL TOTAL
N90 R7=0; POZITIA PE X A CENTRULUI BUZUNARULUI
N100 R8=0; POZITIA PE Y A BUZUNARULUI
N110 R9=-0.5; ADINCIMEA DE ASCHIERE INITITALA
N120 R10=100; AVANSUL DE PATRUNDERE IN MATERIAL
N130 R11=300; AVANSUL DE LUCRU
N140 R12=0; UNGHIUL INITIAL
N180 G0 Z100
```

Figure 5. The parameterized CNC program for spiral milling

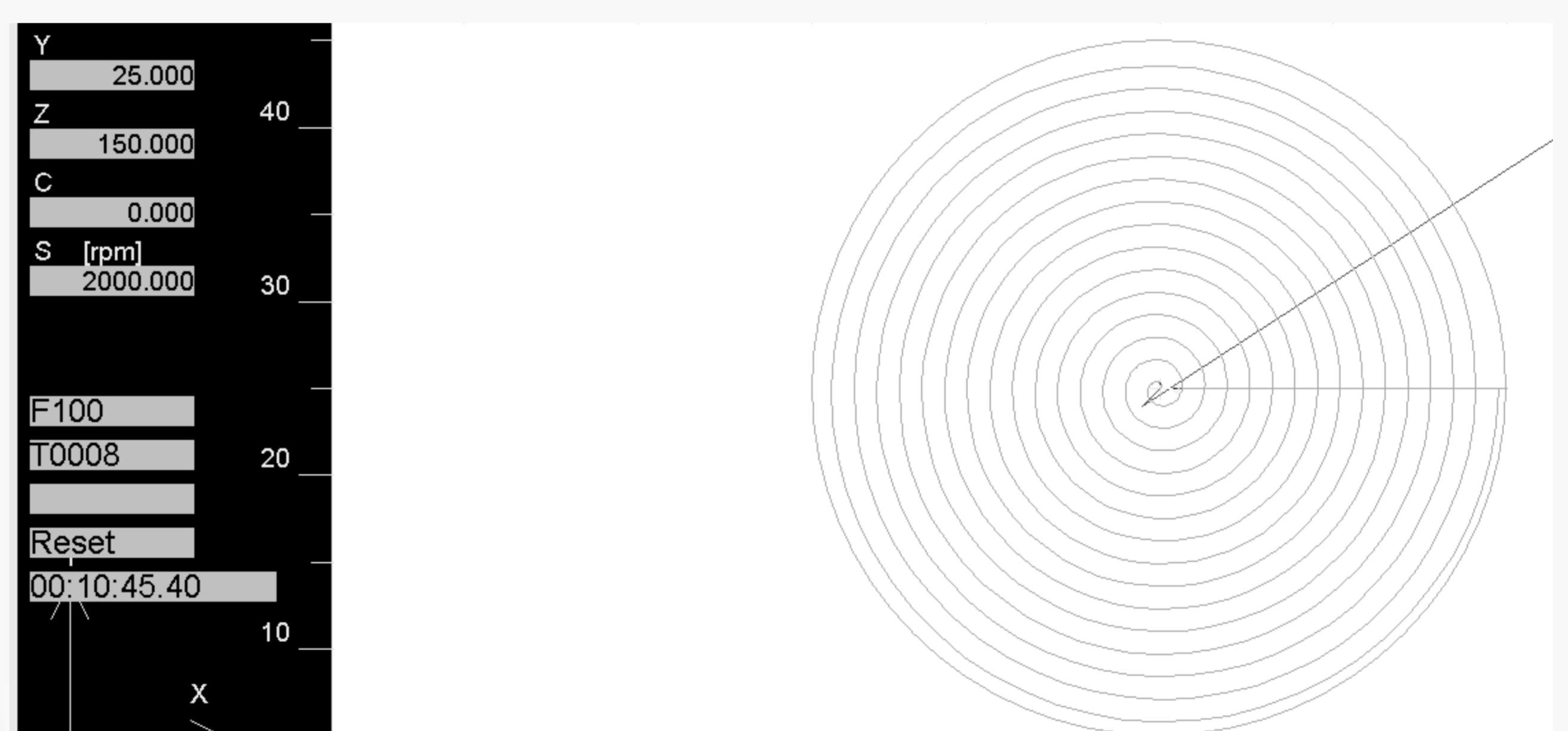


Figure 6. The simulation of the parameterized CNC program for spiral milling

Conclusions

The parameterized programming is used in the production of families of parts, driving accessory devices etc. With this programming method you can save more time in the manufacturing process and it is very easy to use.

References

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