```
 biaopan[l_,α_,lm_:0.5,col_:Green,size_:400]:=
Show[panmian,
Graphics[{{Red,Dashed,Circle[{120,120},120lm]},
{col,Thickness[0.007],Arrowheads[0.04],
Arrow[{{120,120},{120l Cos[α]+120,120l Sin[α]+120}}]}},
ImageSize->size],ImageSize->size]
```

```
proCompass[zuobiao0_,zuobiaot_,k_,S_,θm_,θM_,size_:240]:=
Module[{x,y,l,θl,θ,θlm},x=zuobiaot[[1]]-zuobiao0[[1]];
y=zuobiaot[[2]]-zuobiao0[[2]];l=Norm[{x,y}];
If[l!=0,α=Which[y>=0,ArcCos[x/l],y<0,π+ArcCos[-(x/l)]],α=0];
θ=If[S==0,0,(1/2)ArcTan[(l)/(k S)]];θdeg=θ 180/π 60;
θl=If[θM==0,0,θdeg/θM];θlm=If[θM==0,0,θm/θM];
Framed@biaopan[0.75 θl,α,0.75 θlm,
If[θl<=θlm,RGBColor[0,0.5,0],Red],size]]
```

```
sound=Play[{Sin[9000x],Cos[9000x]},{x,0,0.2}];
```

```
sound2=Play[{Sin[7000x],Cos[9000x]},{x,0,0.2}];
```

```
proMeter1[zuobiao0_,zuobiaot_,k_,S_,θm_,θM_,n_:50,size_:277]:=
Module[{l,θ },l=Norm[zuobiaot-zuobiao0];
θ=If[S==0,0,(1/2)ArcTan[(l)/(k S)]];
θdegM=θ 180/π 60;If[Length[u]<n,u=Append[u,θdegM],
u=Drop[u,1];u=Append[u,θdegM]];
If[θdegM>θm,EmitSound[sound]];
Framed@Show[ListLinePlot[u,PlotRange->{{0,n},{0,θM}},
AxesLabel->{Null,"分"},
AspectRatio->0.85,ColorFunction->Function[{x,y},If[y>0.6,Red,Green]]
,Background->White,ImageSize->size],
Graphics[{{Text[Style[DateString[],{Blue,15}],Scaled[{0.5,0.9}]]},
{Red,Dashed,Line[{{0,θm},{n,θm}}]}}],Frame->True,
FrameStyle->RGBColor[0,0,0.5]]]
```

```
proMeter2[zuobiao0_,zuobiaot_,k_,x_,y_,hm_,hM_,n_:50,size_:277]:=
Module[{ l ,f ,z    },
l=Norm[zuobiaot-zuobiao0];
z=l/k;
f=If[Negative[zuobiaot[[2]]-zuobiao0[[2]]],-1,1];
h=f*(y-Sqrt[y^2-2x*z])/2;
If[Length[uu]<n,uu=Append[uu,h],uu=Drop[uu,1];uu=Append[uu,h]];
If[Abs[h]>hm,EmitSound[sound2]];
Framed@Show[ListLinePlot[uu,PlotRange->{{0,n},{-hM,hM}},
AxesLabel->{Null,"分"},
AspectRatio->0.91,PlotStyle->Purple
,Background->White,ImageSize->size],
Graphics[{{Text[Style[DateString[],{Blue,15}],Scaled[{0.5,0.9}]]},
{Red,Dashed,Line[{{0,hm},{n,hm}}],Line[{{0,-hm},{n,-hm}}]}}],
Frame->True,FrameStyle->RGBColor[0,0,0.5]]
]
```

```
proMeterN[zuobiao0_,zuobiaot_,k_,x_,y_]:=
Module[{ l ,f ,z   },
l=Norm[zuobiaot-zuobiao0];
z=l/k;
f=If[Negative[zuobiaot[[2]]-zuobiao0[[2]]],-1,1];
h=f*(y-Sqrt[y^2-2x*z])/2;
h]
```

```
dataWrite[str_,mode_,dateStart_,dateStop_,α_,θdeg_,h_]:=
Module[{  timeStart,timeStop            },
timeStart=AbsoluteTime[DateList[{dateStart,
{"Year","Month","Day","Hour","Minute","Second"}}]];
timeStop=AbsoluteTime[DateList[{dateStop,
{"Year","Month","Day","Hour","Minute","Second"}}]];
If[AbsoluteTime[]>timeStop,
changeflag["jilu",4];Close[str];n=0;
MessageDialog["记录已停止"];Return[]
];
WriteString[str,"{"];
WriteString[str,ToString[NumberForm[AbsoluteTime[]-timeStart,3]]<>","];
Which[
mode==1,
WriteString[str,ToString[NumberForm[
If[90<(2π-α+π/2)*180/π<=360,(2π-α+π/2)*180/π,(2π-α+π/2)*180/π-360]
,4]]<>","];
WriteString[str,ToString[NumberForm[θdeg,3]]],
mode==2,
WriteString[str,ToString[NumberForm[h,3]]],
mode==3,
WriteString[str,ToString[NumberForm[
If[90<(2π-α+π/2)*180/π<=360,(2π-α+π/2)*180/π,(2π-α+π/2)*180/π-360]
,4]]<>","];
WriteString[str,ToString[NumberForm[θdeg,3]]<>","];
WriteString[str,ToString[NumberForm[h,3]]]
];
WriteString[str,"};"]
]
```