Workshop

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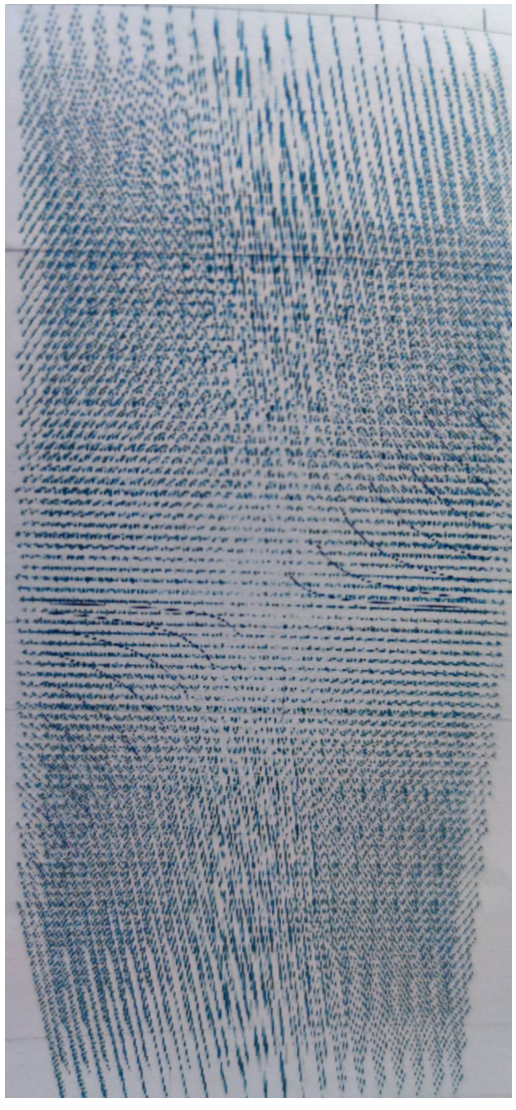
Model

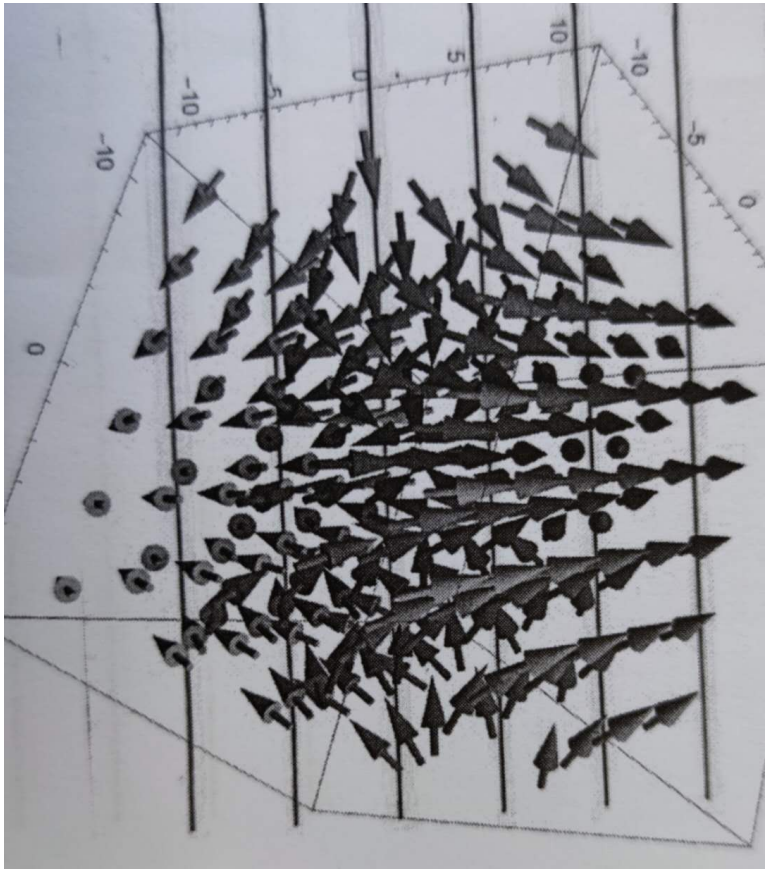
- Research
  - Search on Internet;
  - Use pen and paper to record the details.
- Divide your work
  - Make sure everyone knows what the model is;
  - Get to know your teammates.

Coding

- Choose **one** easy and powerful programming language;
  - MATLAB, Mathematica, R, Python, Julia ...
  - Plotting is the most important step;
  - There are also some theoretical calculations.
- Be familiar with the useful functions (plotting, calculating);
- Always save your code and result (git, svn, dropbox ...)!
- Organize your work well. The code should be easy to check and modify.

Example





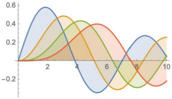
Example

Plot

Plot multiple filled curves, automatically using transparent colors:

In[1]:= **Plot[Evaluate[Table[BesselJ[n, x], {n, 4}]], {x, 0, 10}, Filling → Axis]**

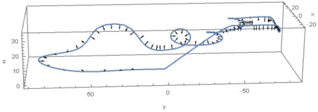
Out[1]=



- Scope (27)
  - Sampling (9)
  - Labeling and Legending (8)
  - Presentation (10)
- Options (110)
  - AspectRatio (1)
  - Axes (2)
  - AxesLabel (2)
  - AxesOrigin (2)
  - AxesStyle (1)
  - BaselinePosition (1)
  - ClippingStyle (5)
  - ColorFunction (5)
  - ColorFunctionScaling (3)
  - Epilog (2)
  - EvaluationMonitor (3)
  - Exclusions (7)

```
In[•]:= Tcurve[t_] := curve'[t] / Norm[curve'[t]]
                                    |模
        Nkcurve[t_] := Cross[Cross[curve'[t], curve''[t]], curve'[t]] / Norm[curve'[t]^4]
                       |叉积   |叉积                                    |模
        Ncurve[t_] := Nkcurve[t] / Norm[Nkcurve[t]]
                                   |模
        Bcurve[t_] := Cross[Tcurve[t], Ncurve[t]]
                      |叉积
        curveplot = ParametricPlot3D[curve[t], {t, 0, 1}];
                    |绘制三维参数图
        ar = Table[{curve[t], curve[t] + 4 * Ncurve[t]}, {t, 0.01, 0.99, 0.01}];
             |表格
        Show[curveplot, Graphics3D[{Arrowheads[0.01], Arrow[ar], Red, AbsolutePointSize@1, Point@ar[[
        |显示            |三维图形     |箭头头部              |箭头     |红色 |绝对点大小            |点
```

Out[•]=




```
In[•]:=

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In[•]:= period := 52;
        referencetime := 45.5
        par = p /. solve[[2]];
        Plot[par[t], {t, 0, period}]
        |绘图
        r[t_] := curve[par[t]]
        vol[t_] := ND[r[x], x, t]
        acc[t_] := ND[vol[x], x, t]
        gvector := {0, 0, -g}
        head[t_] := (acc[t] - gvector) / Sqrt[acc[t][[1]]^2 + acc[t][[2]]^2 + (acc[t][[3]] + g)^2]
                                         |平方根
        Yleft[t_] := Cross[head[t], Tcurve[par[t]]];
                     |叉积
```

Tools

- VSCode with extensions;
  - LaTeX Workshop (snippets, symbol tables);
  - Code Spell Checker and Dictionary Completion (check your spelling).
- OverLeaf (`https://latex.sjtu.edu.cn/`);
- Markdown Editor (`https://notes.sjtu.edu.cn/`);
- Diagram (`https://app.diagrams.net`);
- TikZ.

Have fun in UPC!