



Big data analysis

- A. Product quality control chart
- B. Data regression analysis
- C. Practical big data analysis and Application

Part one

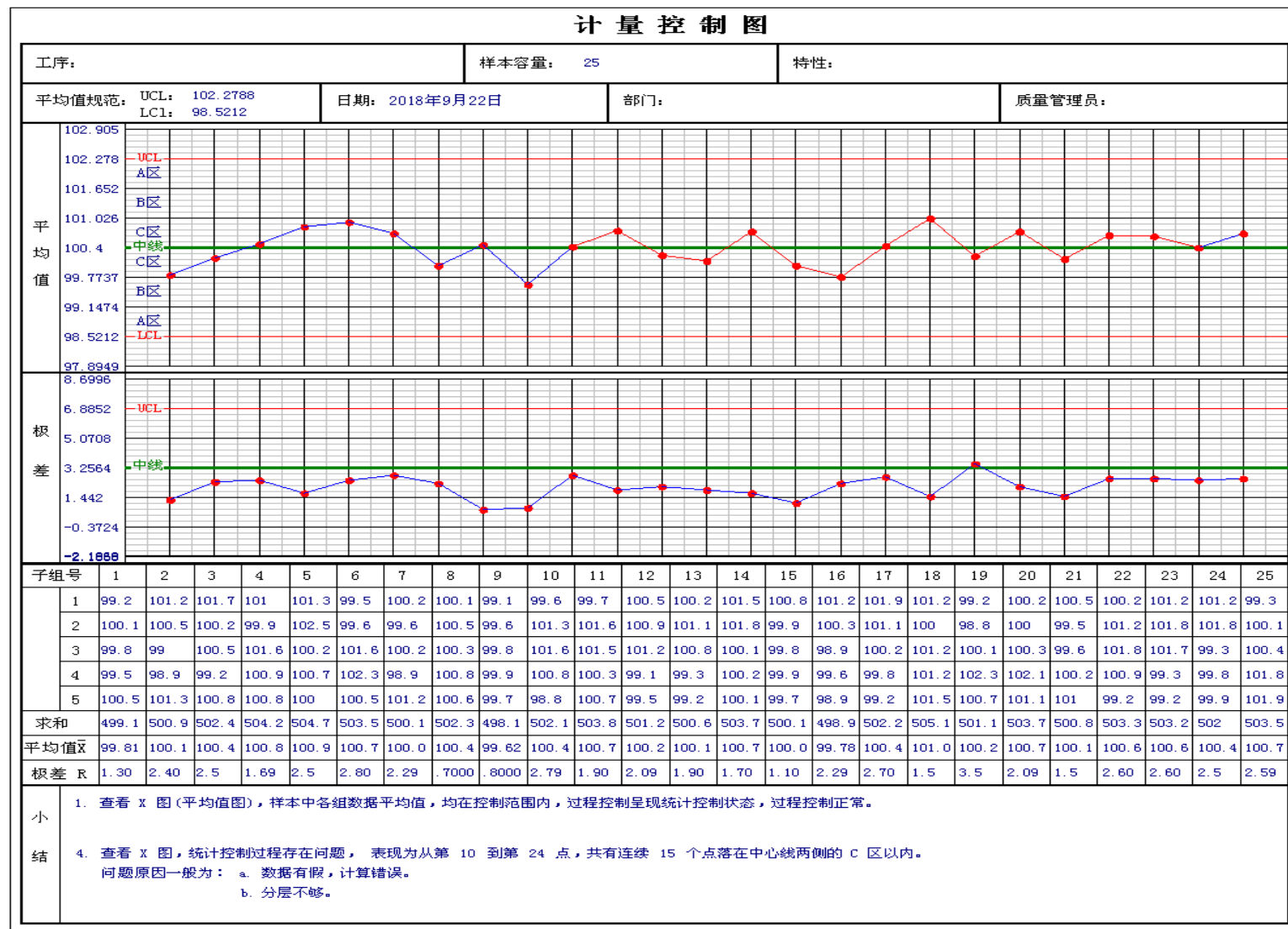
Product quality control chart

- A. Quality control chart is one of the effective measures to monitor and analyze data quality.
- B. The quality control charts are compiled according to the national inspection standards.

Detailed:GB_T_4091-2001

Quality control chart

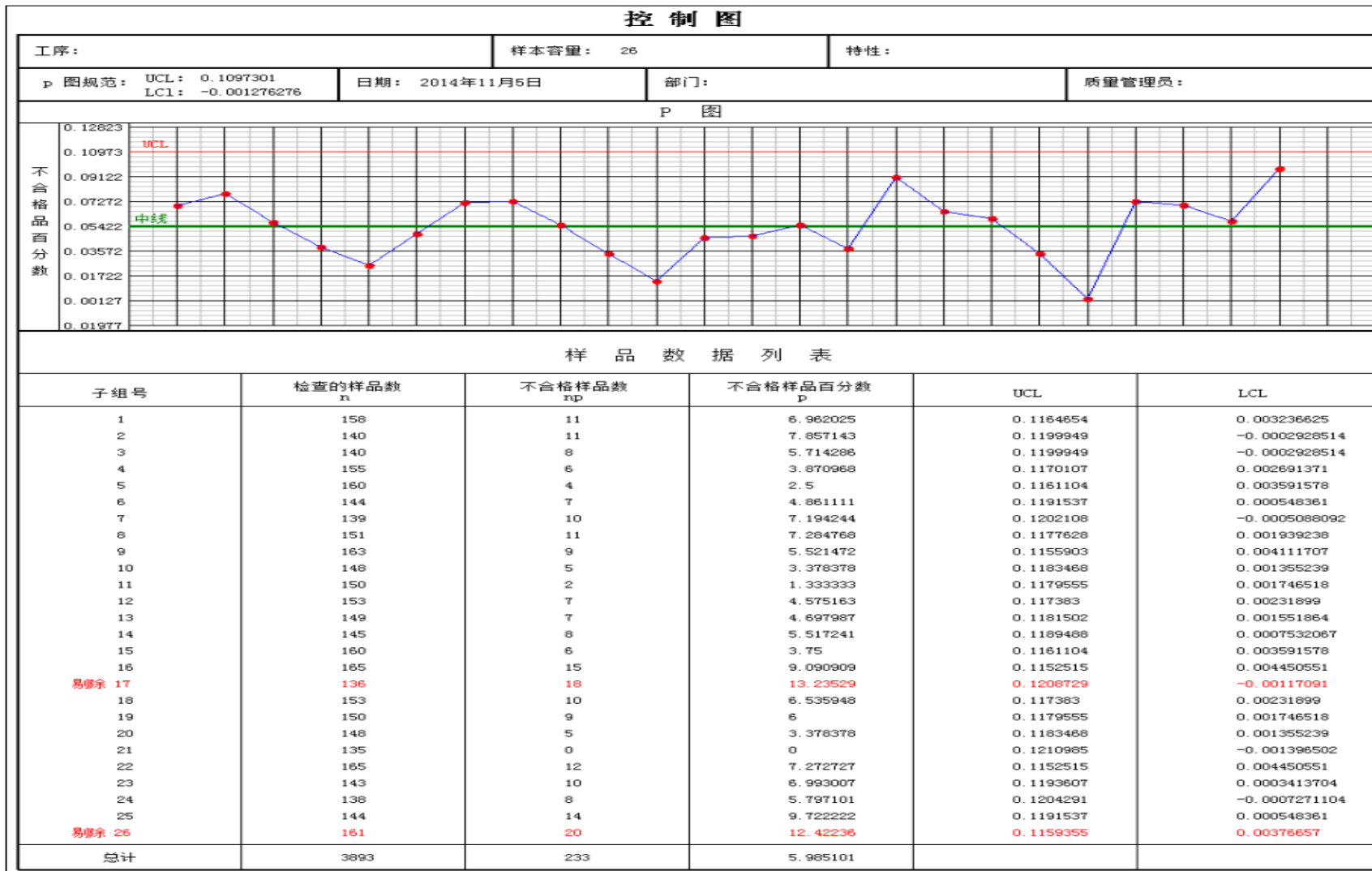
Metrological Control Chart



Quality control chart

Count control chart

控制图



Application of quality control chart

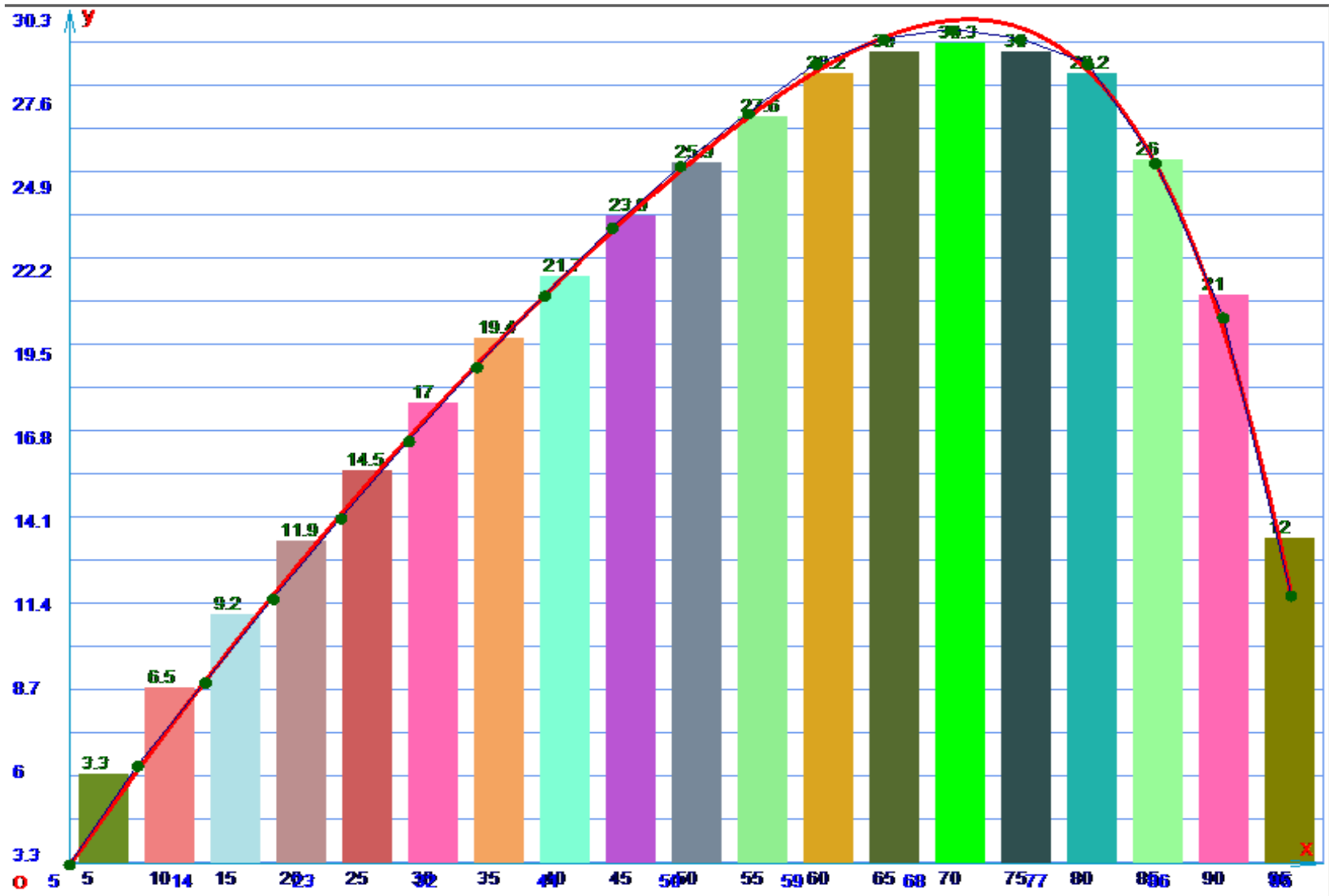
- A. The government's product quality supervision organization.
- B. Enterprise production management department.
- C. Enterprise production department.

Part two

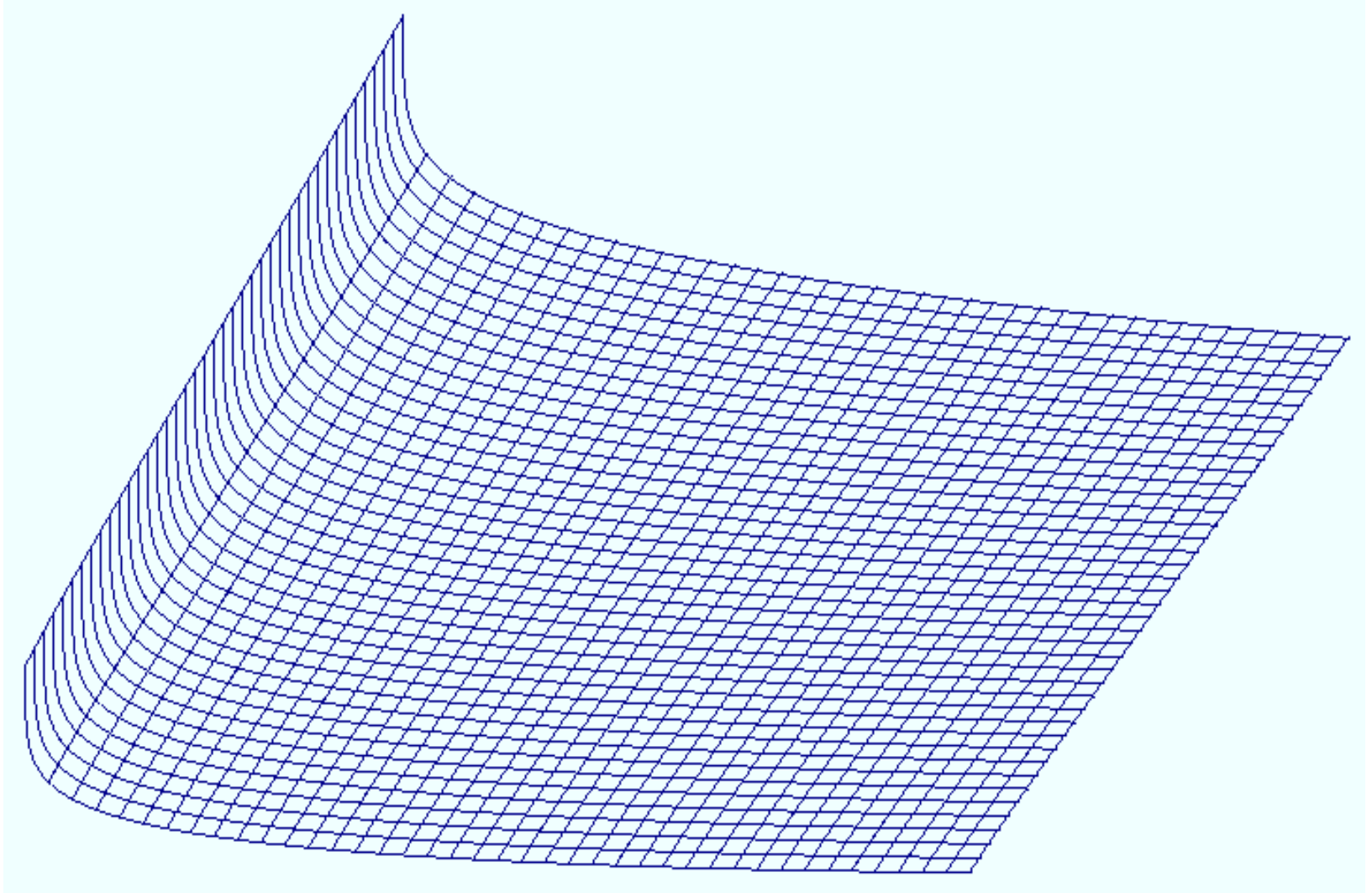
Data regression analysis

- A. Data regression analysis is the data modeling method invented by Gauss 200 years ago - "least squares method".
- B. We developed a data regression analysis software tool, which is based on our own research and development of the "New Square Method" for the principle of compilation.
- C. The "New Square Method" makes the regression analysis results of multidimensional nonlinear data more accurate.
- D. "New Square Method" The paper DOI: 10.4172/2168-9679.1000342

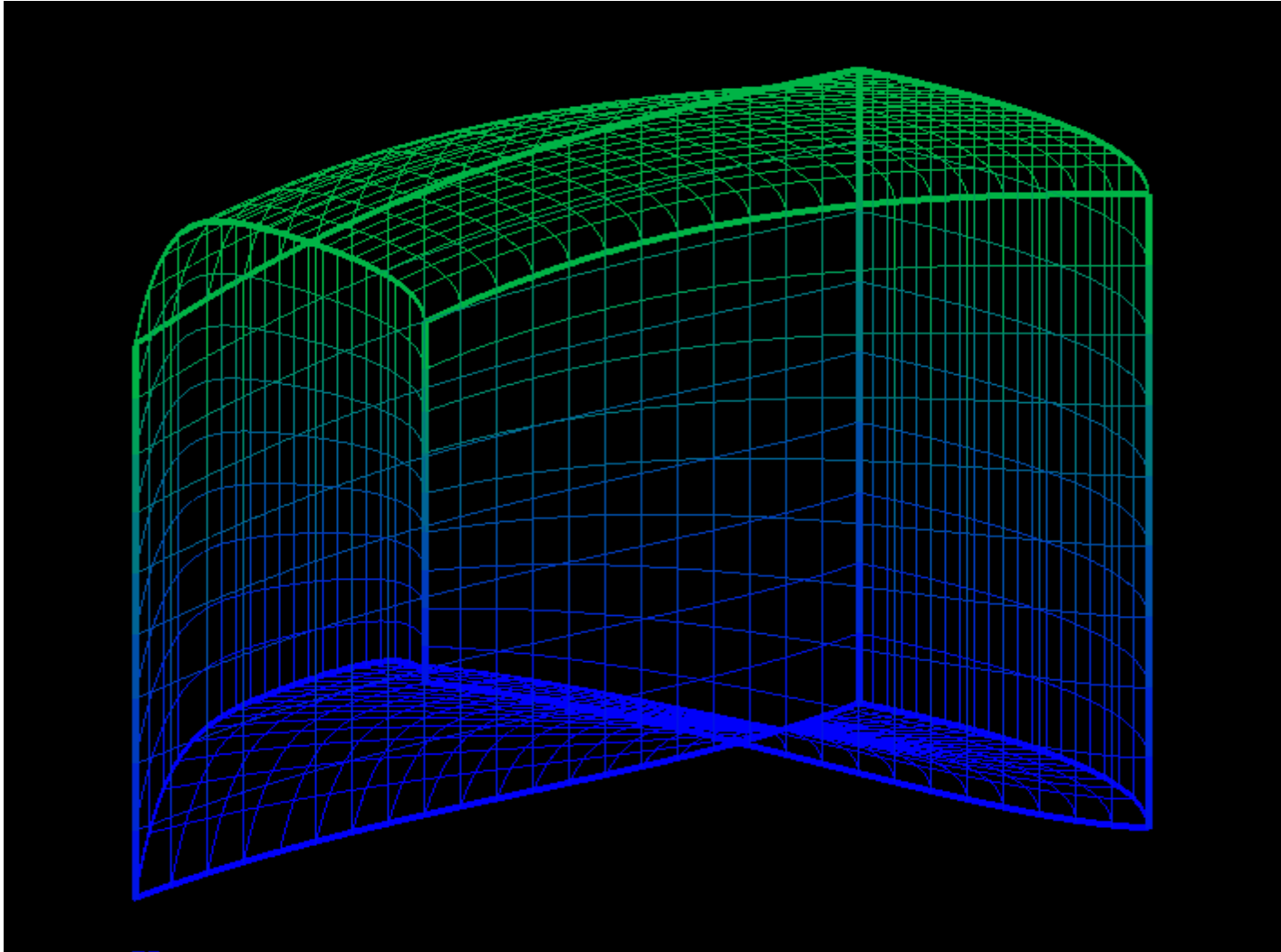
Data regression analysis - 2D graph



Data regression analysis - 3D graph



Data regression analysis - 4D graph



Application of data regression analysis

A. Lab

B. engineering design

C. Computer simulation prediction in Engineering

D. Optimization control in engineering process

E. Manufacture and use of instruments

Lab

Experiments are a way for people to study the causality of something and its changing law. Usually, experiments can get some relevant data. These data deduce the changing process of things. We can regression these data into mathematical models to help us analyze and solve practical problems.

Engineering design

In engineering design, a lot of complex calculations are needed. These calculations depend on experimental data or on the charts drawn on the basis of a large number of experimental data. These experimental data or charts are regressed into mathematical models, and the calculation process and mathematical models are programmed into computer programs. Then, such complex calculations will be pressed several times. The correct result is obtained in the case of keys.

Computer simulation prediction in Engineering

In the engineering process, a large number of relevant data can be regressed into a mathematical model, and the mathematical model reflecting the process can be programmed into a software. In the future engineering process, the situation of the engineering process can be forecasted by this software, so as to achieve the purpose of computer forecasting. In the same way, computer simulation can also be done, through the accumulation of a large number of related data to establish mathematical models, compiled corresponding simulation software, using the computer to simulate the operation.

Optimization control in engineering process

Establishing mathematical model by data regression, compiling computer program and inputting computer can realize process optimization control. Because of the complexity of actual process, it can not be controlled accurately only by model. It can be combined with fuzzy control. Although model control is relatively inaccurate, it has predictive function and can be carried out. Advanced control and fuzzy control are accurate, but they are controlled after the result feedback. The control point of complex process to the control target has a time lag, which causes the control lag of fuzzy control, the model control is inaccurate, the fuzzy control is lagging but accurate. The combination of the two complements each other's shortcomings, making the process better. The combination of model control and fuzzy control is the development direction of computer control for process optimization. In addition, there are too many factors affecting the complex process, and computer constraints make it difficult to establish some models, which can divide the complex process into a number of units, so that the factors affecting the unit are reduced. Control, so as to achieve the purpose of computer optimal control.

Instrument manufacturing

Some characteristic data of a substance can be detected by some means (such as spectroscopy, chromatogram, etc.). A large number of data and characteristic data can be correlated into a mathematical model, and the corresponding characteristic data can be calculated by some means. With this method, a testing instrument can be produced.

Part three

Practical application of big data analysis

- A. Big data is: with the rapid development of computers, the continuous progress of computing methods, information storage methods are constantly convenient and fast, storage media capacity continues to increase, stored in the computer memory a large number of various types of information. It includes all kinds of videos, audio, pictures, documents and numbers.
- B. Numbers are: a large number of numbers describing the process of something by manual recording or instrumental testing. "BDA" big data analysis system is aimed at these descriptive process of the number of things, analysis and mining processing tools.

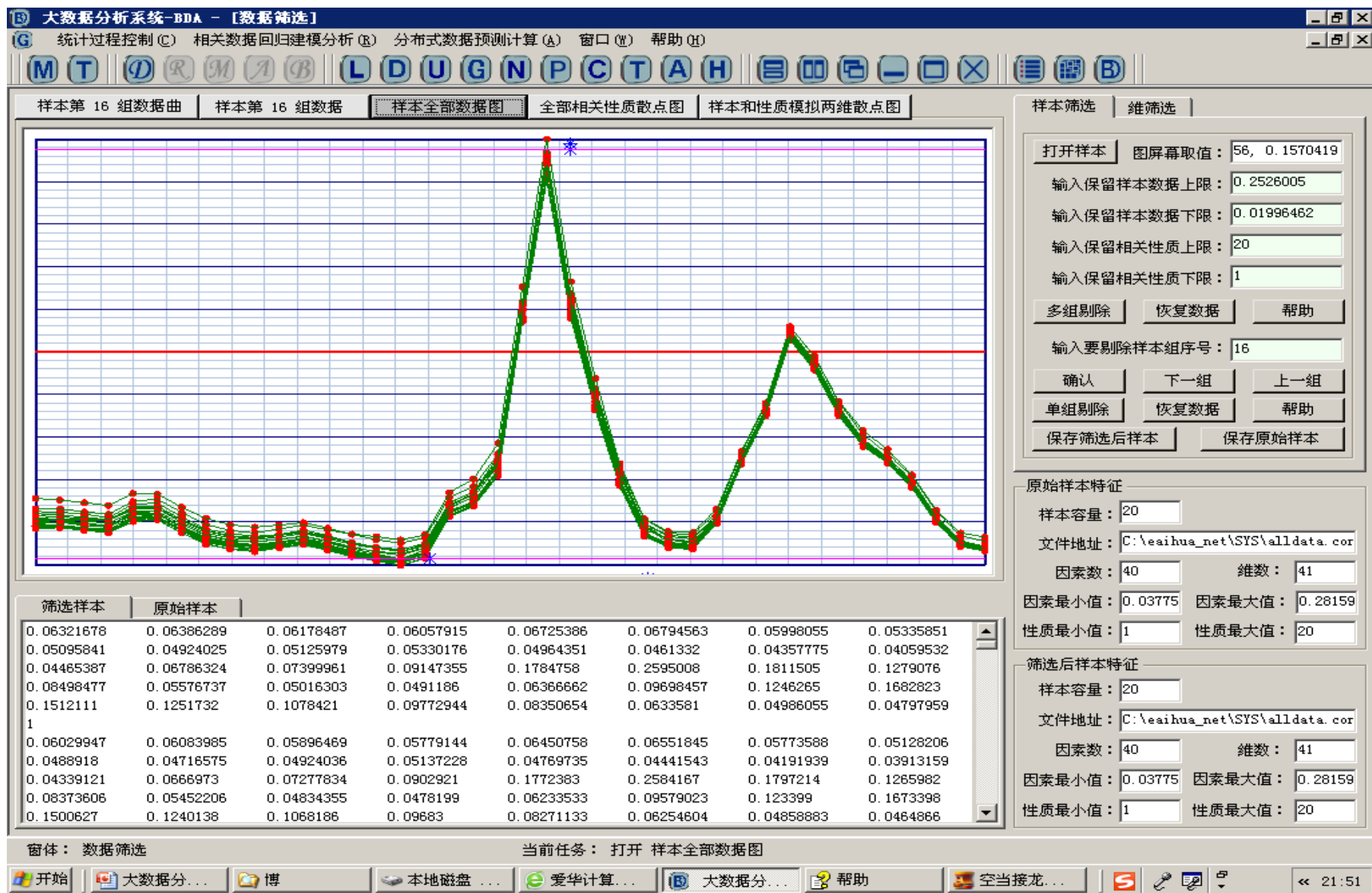
Big data characteristics

- A. The data range is large: if the data is depicted in two dimensional plane or three-dimensional space, its scope is large.
- B. High data density: If you describe data in two-dimensional plane or three-dimensional space, each group of data as a point, the distance between points is small, or even overlap, so the density is high.
- C. Data change is complex: because the data range is large, so the data changes irregularly, with the existing "new square method", it is difficult to find a mathematical model to describe, it is also unable to fit the available mathematical model.

Dynamic local analysis

- A. Dynamic local analysis method: the original historical data are screened, Eliminating unreasonable samplest. The screened N groups of samples are used as standard sample groups and placed in the calculation program.
- B. Look at the sample as a point, Each sample in the standard sample group is also regarded as a point, Compare each sample in the sample and standard sample group, find the nearest n points, n can be set to 10-20.
- C. Use the “New Square Method” to model the retrieved n group samples.
- D. The samples are calculated by this model, and the calculated results meet the actual needs.

Data screening window



Establish method window

大数据分析系统-BDA - [创建方法]

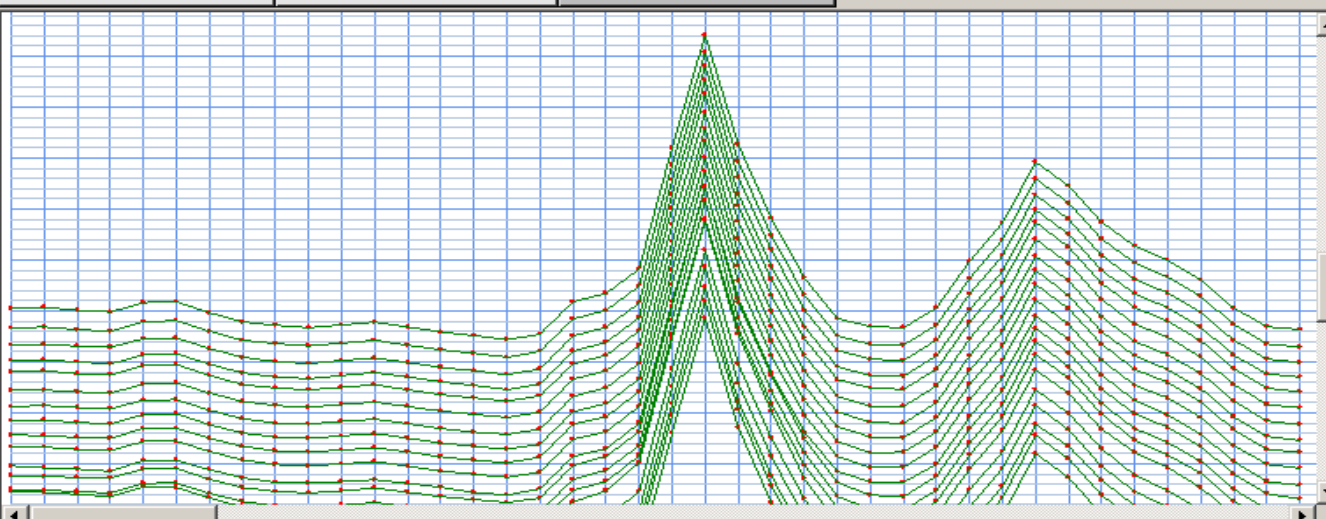
统计过程控制(C) 相关数据回归建模分析(R) 分布式数据预测计算(A) 窗口(W) 帮助(H)

M T D R M A B L D U G N P C T A H

显示优化匹配得到的数据

第 1 维	第 2 维	第 3 维	第 4 维	第 5 维	第 6 维	第 7 维	第 8 维
0.06321678	0.06386289	0.06178487	0.06057915	0.06725386	0.06794563	0.05998055	0.05335851
0.06029947	0.06083985	0.05896469	0.05779144	0.06450758	0.06551845	0.05773588	0.05128206
0.05891411	0.05971445	0.05818762	0.05737606	0.0635919	0.06406847	0.05645573	0.05013386
0.05914081	0.05935512	0.05796262	0.05657073	0.06291568	0.06383396	0.05631202	0.04998099
0.06210614	0.06259943	0.06061835	0.05978022	0.06653678	0.06716556	0.05925319	0.05271013
0.05978357	0.05991565	0.05862881	0.0577405	0.0641631	0.06498341	0.05771427	0.05170951
0.05926013	0.0598781	0.05850849	0.05749843	0.063759	0.06402624	0.05646424	0.05029803
0.06024266	0.06065002	0.05886993	0.05788725	0.06448643	0.06510463	0.05727933	0.05111392
0.0608155	0.06064589	0.05813981	0.05853936	0.06560143	0.06570581	0.05863447	0.05264657
0.06333168	0.06335773	0.06165427	0.06084628	0.06735393	0.06764983	0.0601716	0.05401831
0.06090427	0.05958608	0.05864727	0.05896435	0.06488014	0.06496421	0.05817135	0.05230226
0.0648754	0.06442536	0.06384678	0.06344087	0.06980138	0.07031391	0.06230359	0.05641949

样本数据实际位置图 样本数据左右错开比较图 样本数据上下错开比较图



优化匹配数据情况

文件地址: C:\eaihua_net\sys\Cres

样本容量: 20 打开样本

因素数: 40 保存数据

维数: 41 帮助

因素最大值: 0.260031

因素最小值: 0.04014581

性质最大值: 20

性质最小值: 1

创建方法

☐ 线性回归法 ☐ 手拉手关联

☐ 计量统计法 ☒ 综合分析法

方法命名: 某某

创建方法 帮助

样本数据图设置

第几维: 1

图左右移动值: 0

图上下移动值: 0

图左右放大: 0

图上下放大: 0

各数据图左右间距: 0

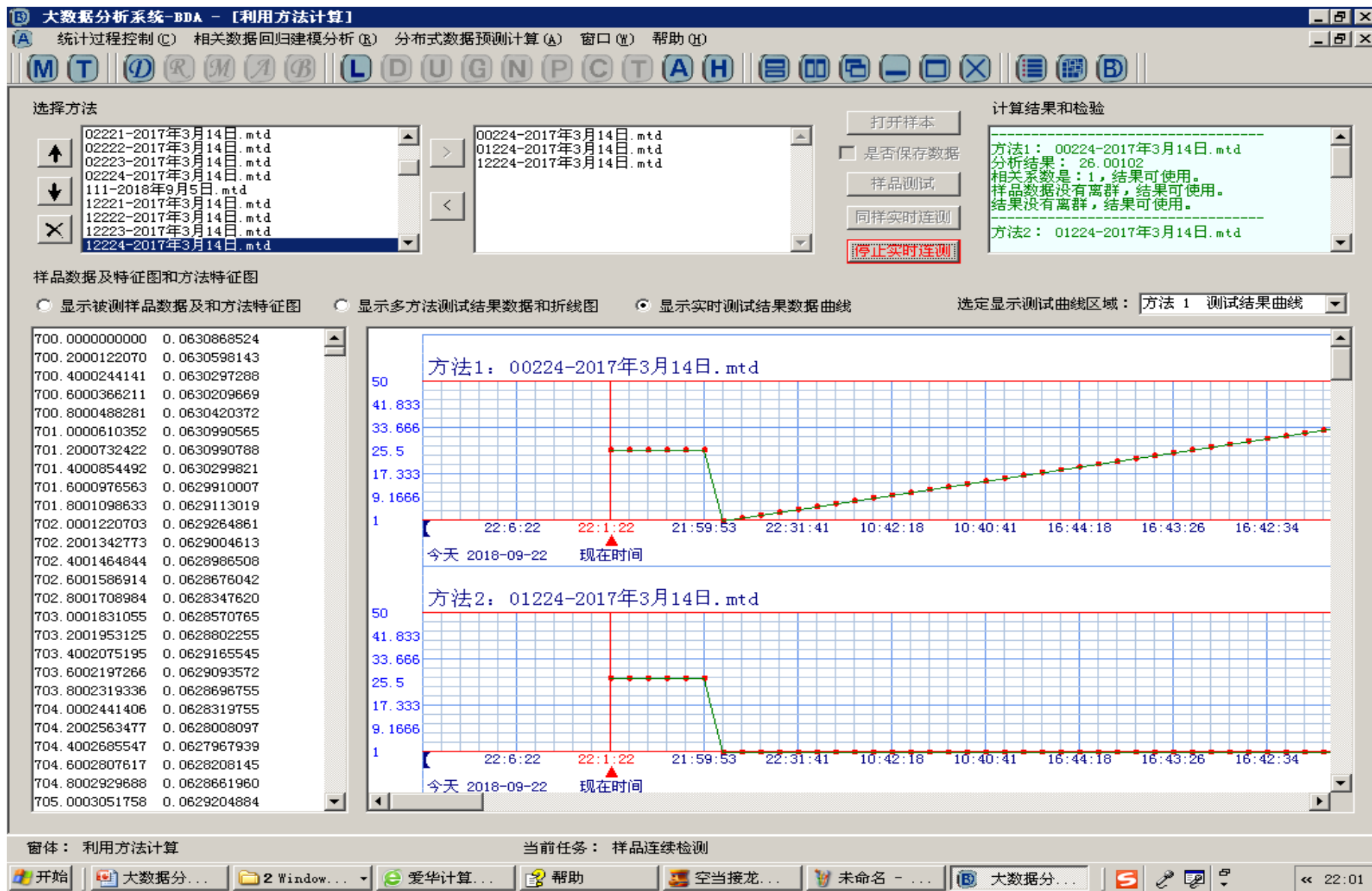
各数据图上下间距: 10

默认 刷新 帮助

窗体: 建立方法 当前任务: 创建方法

开始 大数据分... 2 Window... 爱华计算... 大数据分... 帮助 空当接龙... 未命名 - ... 21:55

Result calculation window



Application direction cases

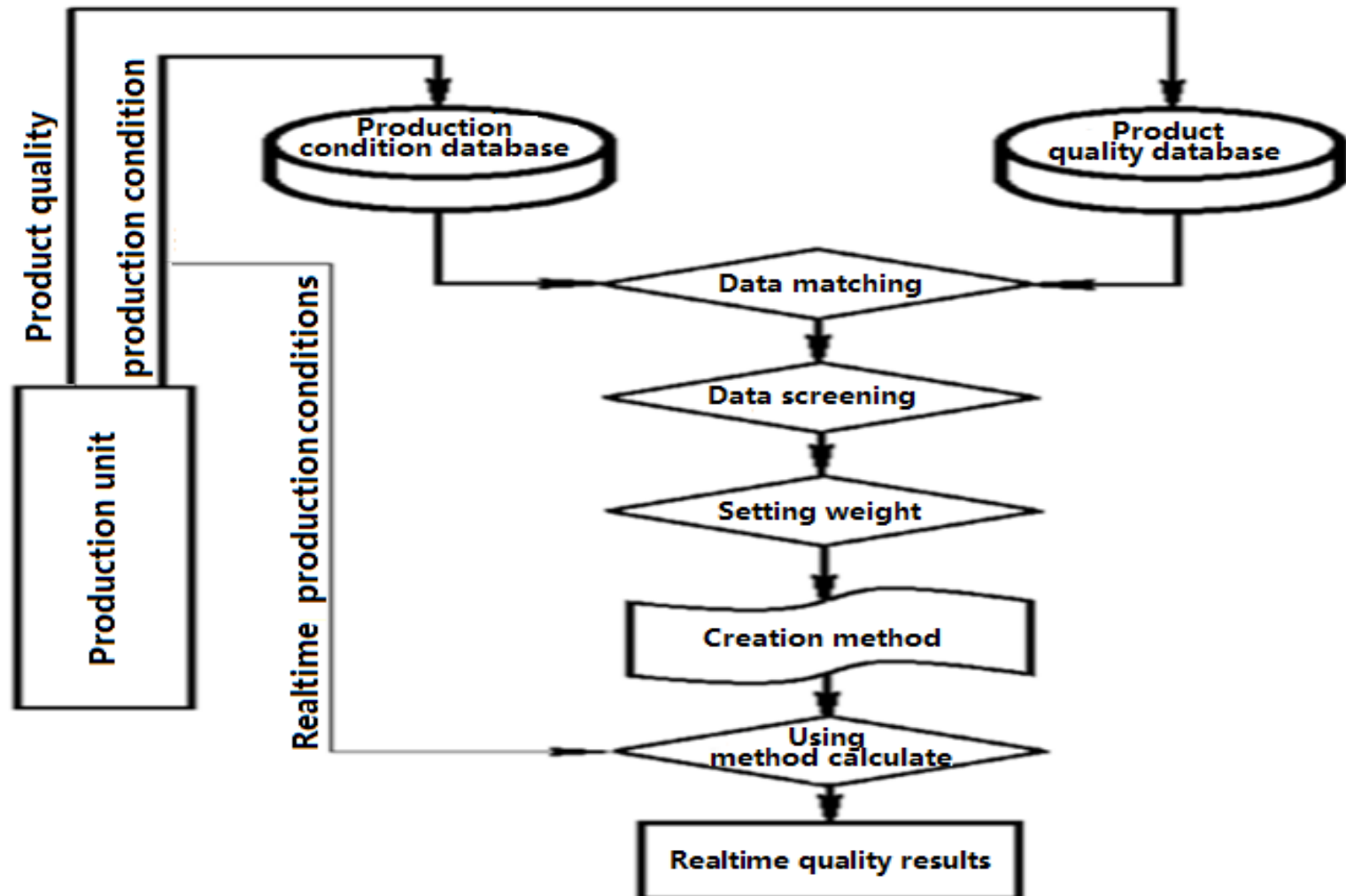
Continuous automatic production

Quality real-time monitoring system

Quality real-time monitoring target

- A. In the process of production, the quality of products is predicted and quality real-time monitoring is realized.
- B. Monitoring to factors affecting quality (including control points and display points) such as temperature, pressure and flow.
- C. Find out the problems in production operation in time, grasp the quality change trend, adjust and ensure the normal operation of production in time.

Basic thinking block diagram



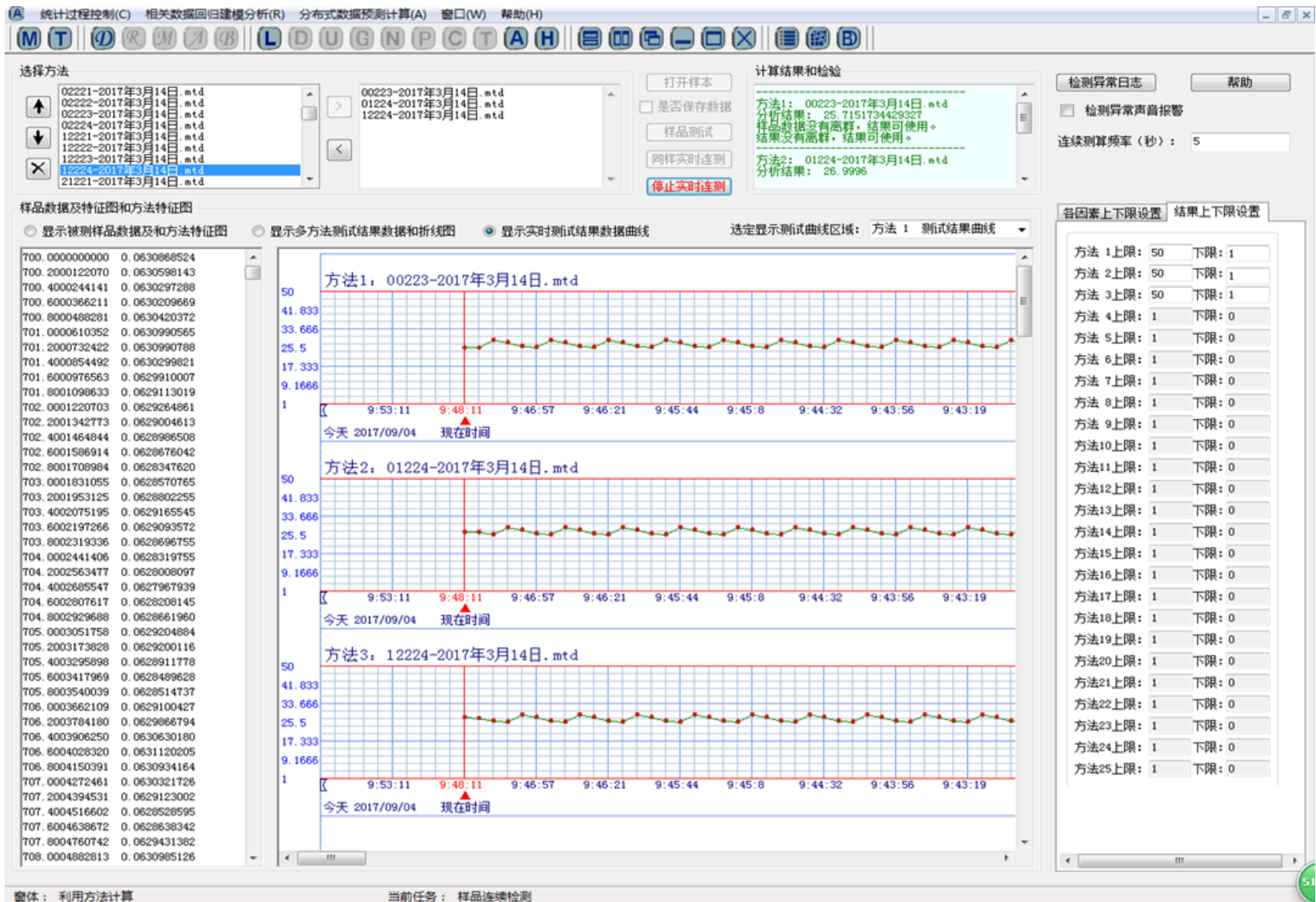
Quality real-time monitoring method

- A. Process parameter data and quality data in production process, large amount of data (big data) and complicated changes.
- B. The system adopts the dynamic local analysis method.
- C. This system can analyze the data of multi-factors (up to 40) affecting the quality, so it can adapt to most devices.

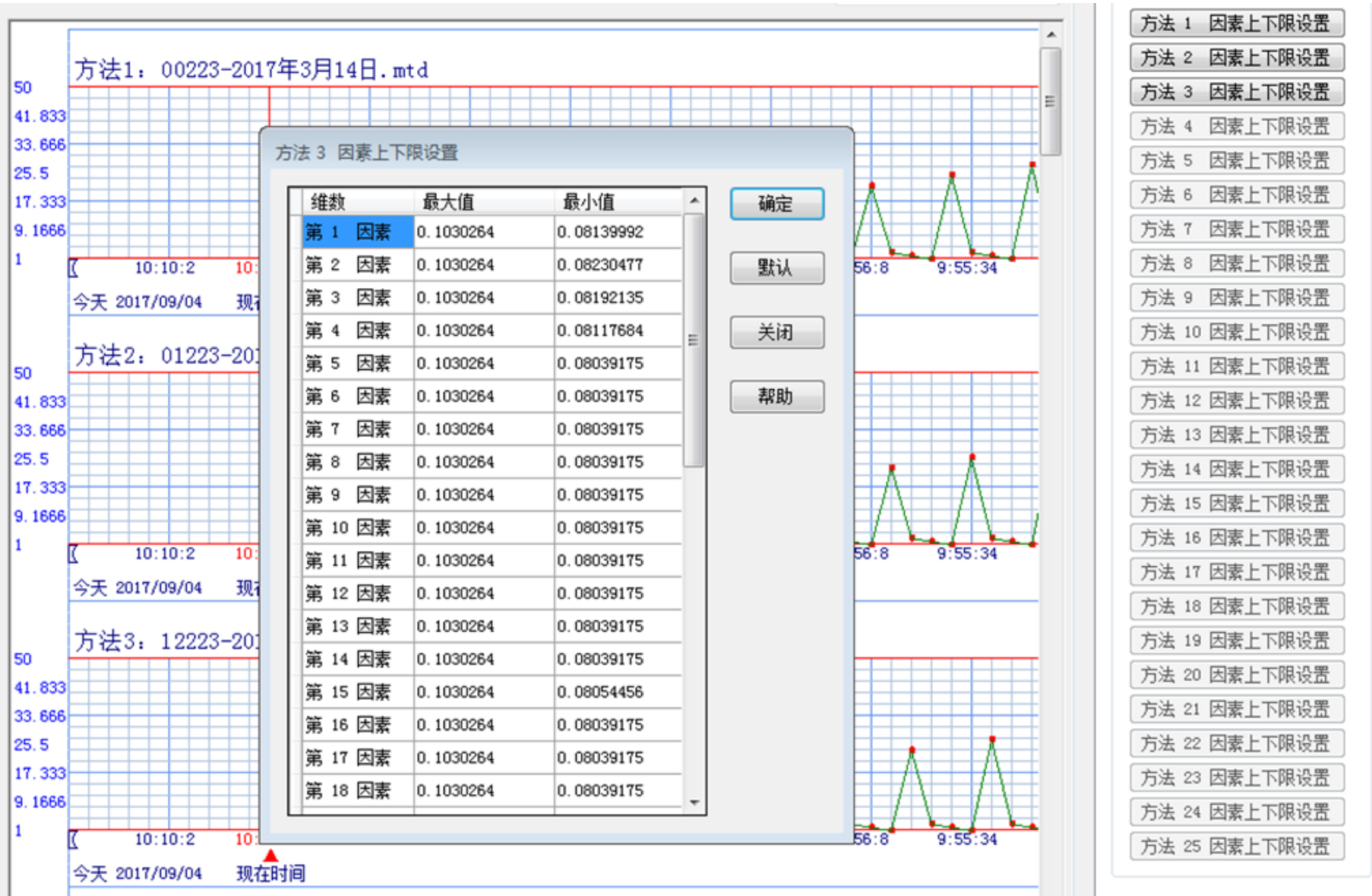
Quality real-time monitoring advantages

- A. Compared with the original detection method, we get the quality data in advance.
- B. The frequency of calculation is high, the highest quality can be measured in a few seconds, and the quality trend curve can be made.
- C. Process condition parameters are monitored.
- D. It is safe and environmentally friendly to calculate the analysis results without sampling at the outlet.
- E. Reduce the frequency of manual analysis.
- F. It does not affect production operation and does not increase the load of real-time database server.
- G. The cost is lower than other quality analysis.

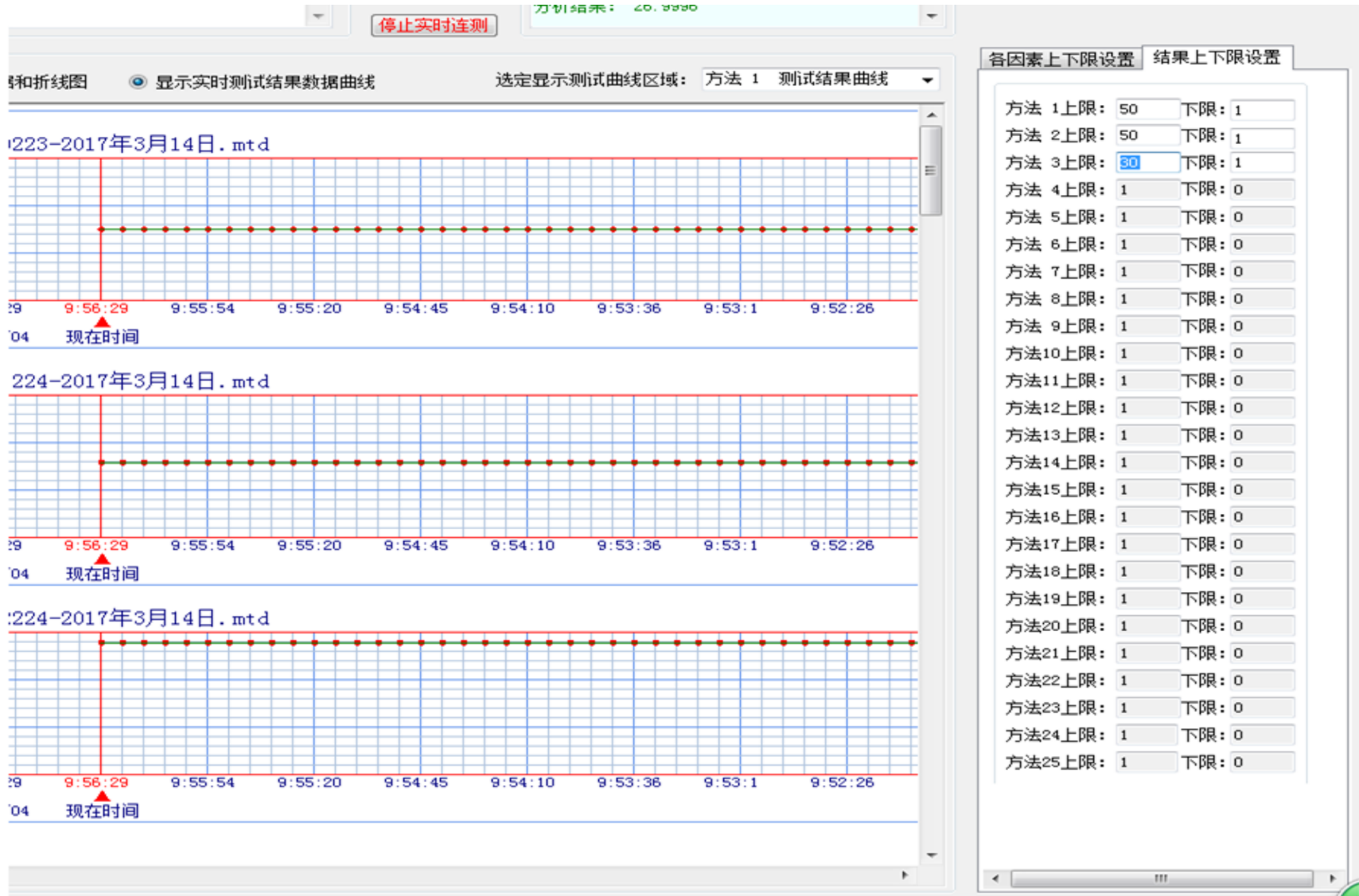
Computer controlled window



Upper and lower limit of production conditions



Product quality monitoring window





End

YanPing Wang
2018. 10. 28