Development of graph digitizing system GSYS2.4 (CP-E/145)
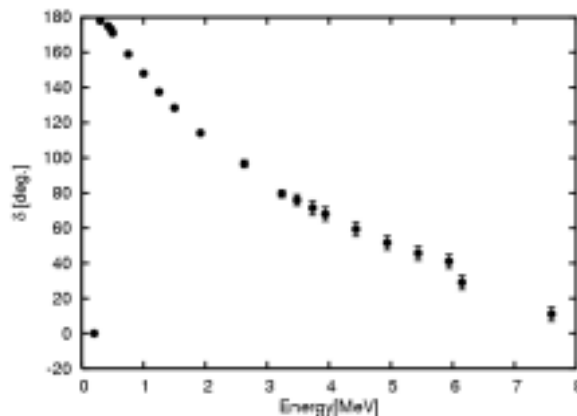
Ryusuke SUZUKI
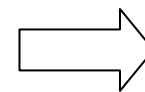
Medical Physics Lab. Hokkaido University Hospital

✓ Nuclear activity for compiling the experimental data published on the paper has two fold

  ✓ Coding the experimental and bibliographical information into the NRDF or EXFOR format.

  ✓ Read the experimental data from the graph on the paper.

digitizing

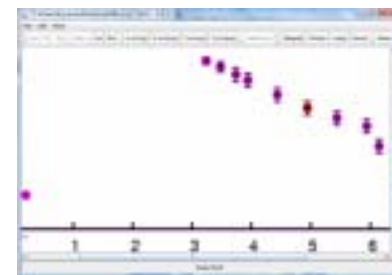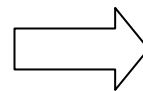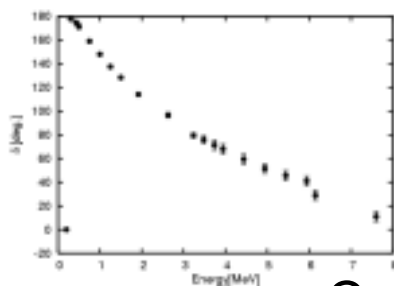| #	x	y	dy
	3.235E+00	7.951E+01	2.451E+00
	3.474E+00	7.608E+01	3.431E+00
	3.740E+00	7.167E+01	4.412E+00
	3.937E+00	6.824E+01	4.412E+00
	4.429E+00	5.941E+01	4.412E+00
	4.934E+00	5.157E+01	4.412E+00
	5.440E+00	4.569E+01	4.412E+00
	5.945E+00	4.078E+01	4.412E+00
	6.156E+00	2.902E+01	4.412E+00
	7.602E+00	1.088E+01	4.412E+00

graph

Numerical data

Introduction 2/2

✓ Though, recently it becomes possible to obtain experimental data in cooperation with experimentalists, it is necessary to convert the graphical data on the paper into numerical data in case that numerical data cannot be obtained from the author.

✓ Exactly speaking, the experimental data from the author is not published data, not reviewed by the referee.

✓ We should note the handling of the data from author.

✓ GSYS2 is also used to check the data as well as digitizing.

+

Called as feedback in GSYS2

✓ In the past, an input device called 'digitizer' was used for reading the numerical data from printed matters.

✓ History (JCPRG)

    ✓ 1984 Digitizer of Hokkaido University information initiative Center was used.

  ✓ 1985- : JCPRG started to develop their own digitizer.

    ✓ 1985- : GRADIS (Tanaka, Kazama)

    ✓ 1989- : GRADIS2 (Kazama)

    ✓ 1991- : Update digitizing system (Okabe)
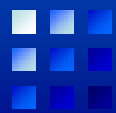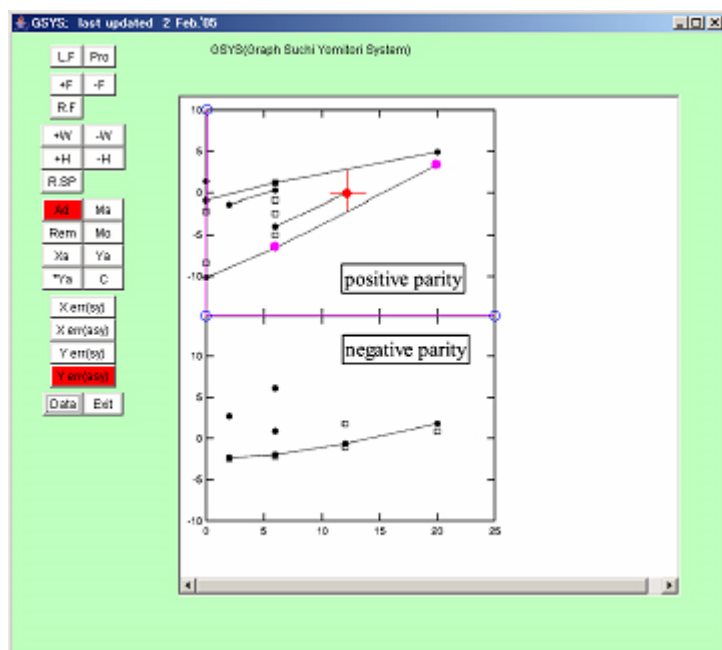
Japanese digitizing activity 2/2

- ✓ Recently, the numerical data is read from an image file which is converted from a graph on a paper.
- ✓ First attempt is to develop system on image analysis software.
- ✓ 1998 – 2005 SyGRD (Dr. H. Ohmi)
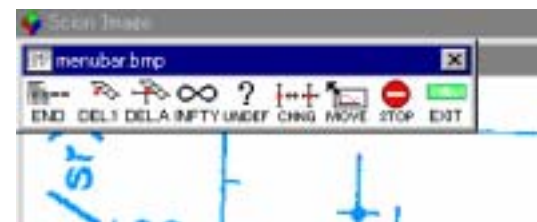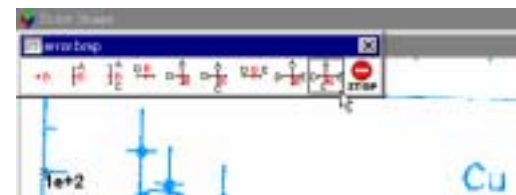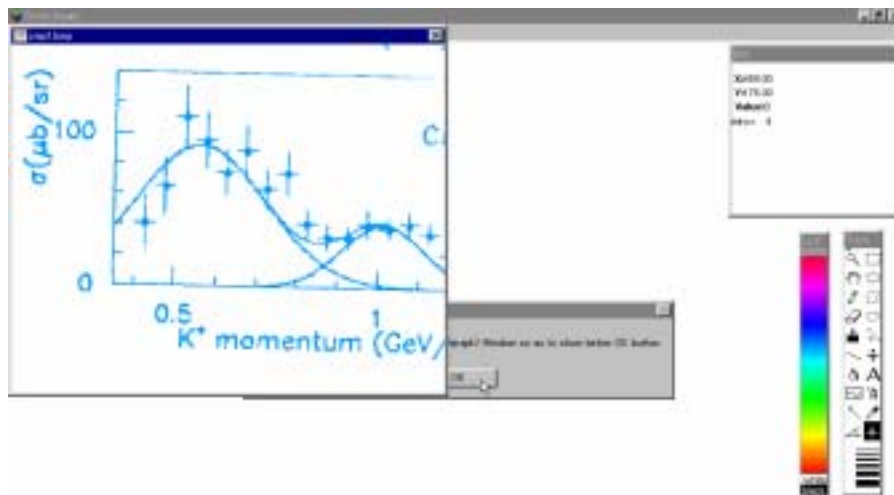
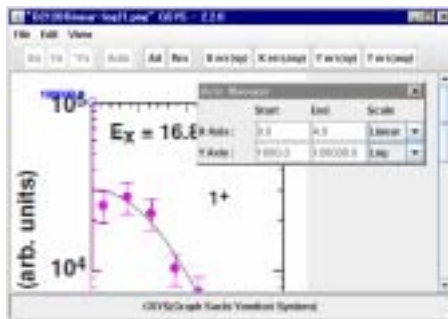✓ In the fiscal year 2004, the first version of Gsys has been developed by Dr. K. Arai, as a successive digitizing system of SyGRD.

GSYS is Java application and can be run on user's PC on relatively high-speed. Particularly, it has the advanced interface.

Gsys2

✓ Aug. 2006, R. Suzuki released GSYS2

  ✓ Added feedback function to GSYS in order to reuse the numerical data and check the data accuracy by plotting the numerical data directly on an image.

OUTPUT from digitizer

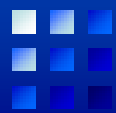INPUT to digitizer
(feedback)

#	x	y	dy
	0.2	2.45E+04	5.38E+03
	0.7	2.73E+04	5.70E+03
	1.2	2.20E+04	4.59E+03
	1.7	1.03E+04	2.27E+03
	2.2	7.46E+03	1.64E+03
	2.7	3.03E+03	6.99E+02
	3.2	2.27E+03	5.49E+02

Figure

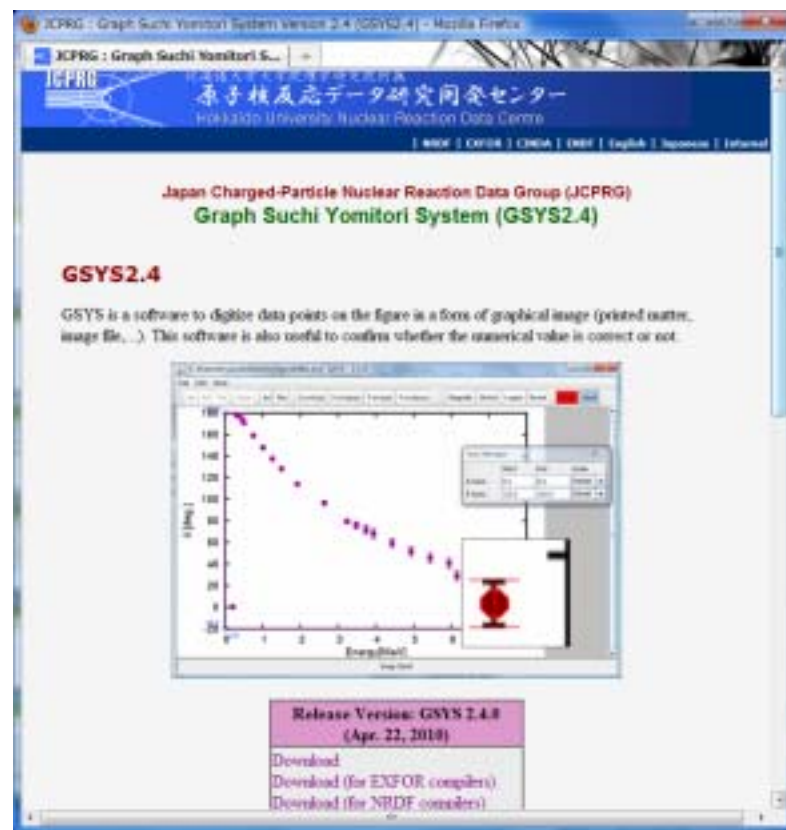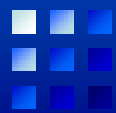**Data**

  ✓ The whole system of user interface was revised.

  ✓ Configuration file was introduced.

Gsys-2.2 and 2.4

- ✓ Dec. 31. 2006, Gsys2.2 was released. (sinya Ito, Suzuki)
  - ✓ Axis automatic detection function
- ✓ Apr. 22. 2010, Gsys2.4 was released (Suzuki, Ito)
  - ✓ Many features
  - ✓ http://www.jcprg.org/gsys/2.4/

Gsys 2.4 New features

- ✓ Drag-and-drop feature: shinya, ryusuke
- ✓ Transparency or points and lines: shinya
- ✓ Loupe function: shinya
- ✓ Automatically point recognition function: ryusuke
- ✓ Addition of Point shape: ryusuke
- ✓ Snapshot function: ryusuke
- ✓ Magnifying glass function: ryusuke
- ✓ Some other improvements
    - ✓ Improvement of Auto axis detection function.
    - ✓ Add Navigation bar (Magnify, Shrink, reset button)
    - ✓ Add command line option (for Unix-like user)
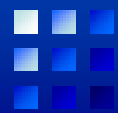   - ✓ Others…

What is GSYS (from Gsys2.2 manual)?

✓ Cross-platform window application which only requires Java Runtime Environment.

✓ Intuitive and light GUI.
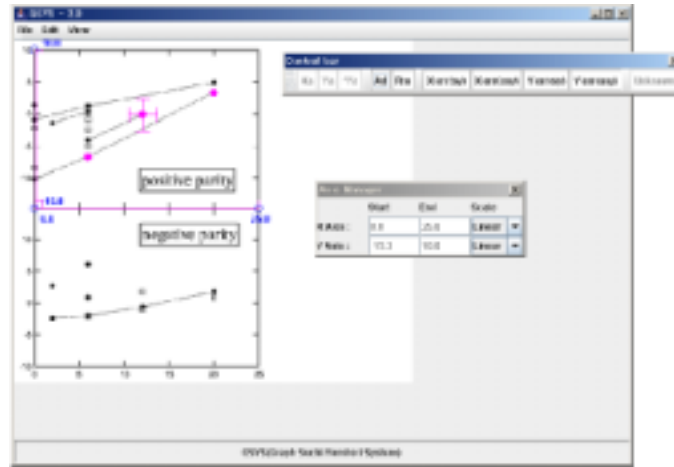
✓ Supports PNG, GIF, and JPEG image formats.

Features of GSYS

- ✓ Flexible input and output that are compatible with many data formats.

- ✓ Feedback function which enables to reuse former data easily check the data accuracy.

- ✓ Easy set-up of X-axis and Y-axis with automatic axis detection.

- ✓ Free but there are terms of use
  - ✓ Please use this system at your own risk.
  - ✓ It is not allowed to use this system for any kind of business purpose.
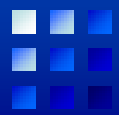
Size of code

Code size
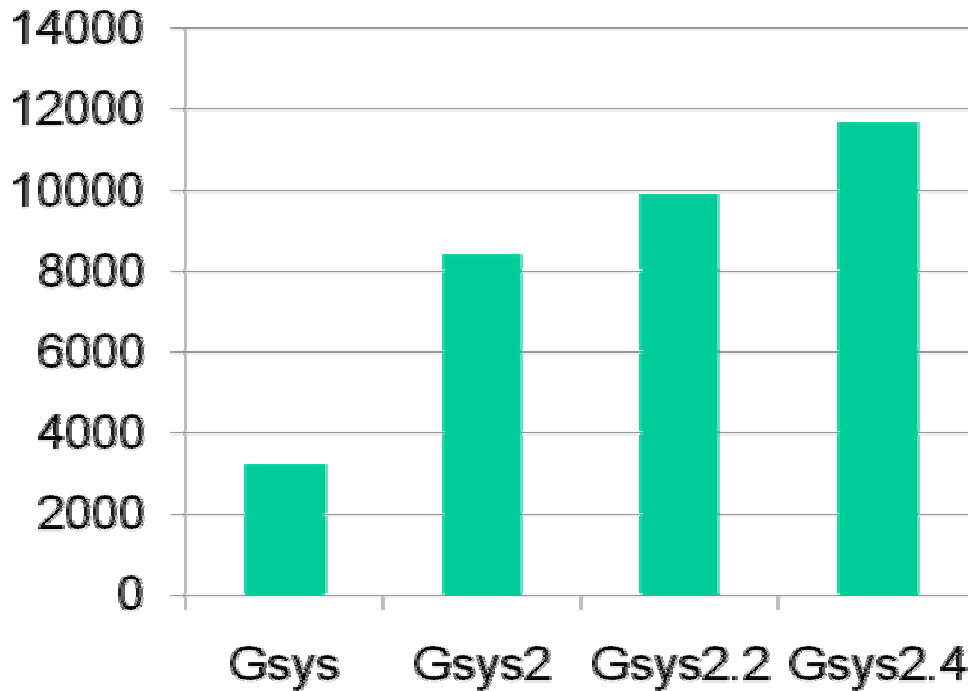
✓ Gsys : 3231 lines
✓ Gsys2 : 8434 lines
✓ Gsys2.2 : 9929 lines
✓ Gsys2.4 : 11689 lines

Quality assurance of GSYS

✓ To provide the stable version of GSYS as possible, GSYS is well tested in JCPRG before release.

✓ This test or developing version is released from developing branch. Release from developing branch is only available for JCPRG and tested in actual JCPRG compilation.

✓ The last release from developing branch is opened to the public.

✓ For example

  ✓ To release 2.2, there are 27 internal version of GSYS (called as 2.1 branch (2.1.0 - 2.1.27))

  ✓ To release 2.4, there are 22 internal version of GSYS, (called as 2.3 branch (2.3.0 - 2.3.22))

  ✓ Now, 2.5 branch is out.
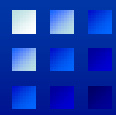
Demonstration

✓ Usual operation using Gsys-2.2 :)

✓ Gsys-2.4, see CP-E/145 ;)

   ✓ 1) Drag-and-drop features

   ✓ 4) Loupe function

   ✓ 5) Magnifying glass function

   ✓ 2) Transparency of the points and lines.

   ✓ 3) Addition of the point shape

   ✓ 6) Automatically point recognition function

   ✓ 7) Snapshot function
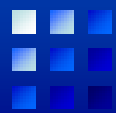
Summary

✓ GSYS is a software to digitize data points on the figure in a form of graphical image. This software is also useful to confirm whether the numerical value is correct or not.

✓ JCPRG has developed digitizing system for over 20 years.

✓ The latest version of digitizing system, Gsys2.4 released yesterday.

✓ To reduce the bug of released version of GSYS as possible, GSYS is well tested in actual JCPRG compilation before release.

✓ Demonstration of Gsys2.4 was performed.