

# On the top page of Calcluster

The image shows a screenshot of the Calcluster website with various elements annotated with callout boxes and red circles. The website has a grey header with navigation links, a main content area with a login form and site information, and a footer with copyright information and additional navigation links.

**Header:**

- [Calcluster Home](#) (circled in red) - Go to the toppage of Calcluster (This page).
- [About us](#) (circled in red) - Go to webpage of our laboratory.

**Main Content:**

- Welcome to Calcluster !** - To save your passwaord, check here.
- Login Form:**
  - (circled in red) - Enter your login ID.
  - (circled in red) - Enter password.
  - Remember me
  - (circled in red) - To login to Calcluster, click here after you enter your login ID and password.
- About this site.**

Calcluster is a cloud-service to provide computing services of numerical analysis through web interface. Now, the singular value decomposition (SVD) by parallel I-SVD library and Multigrid Poisson library are available.
- Information.**
  - Feb. 13, 2012** The service is updated and re-released only for persons belonging to Kyoto University.
  - Jul. 1, 2011** The service is temporarily suspended due to saveing power energy during summer time.
  - Jun. 6, 2011** The alpha version with Multigrid Poisson is released.
  - Jan. 19, 2011** The alpha version with I-SVD is released.

**Footer:**

- [Sign up](#) (circled in red) - To obtain your login ID, click here.
- [Forgot password?](#) (circled in red) - When you forget your password, click here.
- [About us](#) (circled in red) - Go to webpage of our laboratory.
- [Terms of use](#) (circled in red) - Click here, and Usage agreement will be displayed in another window.
- Copyright © 2011 - 2012 Kyoto University All Rights Reserved.

# Obtainment of login ID①

calcluster

**Welcome to Calcluster !**

Login ID

Password

Remember me

#### About this site.

Calcluster is a cloud-service to provide computing services of numerical analysis through web interface. Now, the singular value decomposition (SVD) by parallel I-SVD library and Multigrid Poisson library are available.

#### Information.

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[Sign up](#) | [Forgot password?](#) | [About us](#) | [Terms of use](#)

Click here.

# Obtainment of login ID②

calcluster

Sign up as a new user!

Login	<input type="text"/>	← Enter login ID (at least 3 characters) which you use.
Email	<input type="text"/>	← Enter your E-mail address.
Password	<input type="text"/>	← Enter password (at least 6 characters) which you use.
Confirm Password	<input type="text"/>	← For confirmation, enter the same password.
Agree the terms of use	<input type="checkbox"/>	← If you agree Usage agreement below, check here

(Without this check, you cannot obtain your login ID .)

## 同意事項

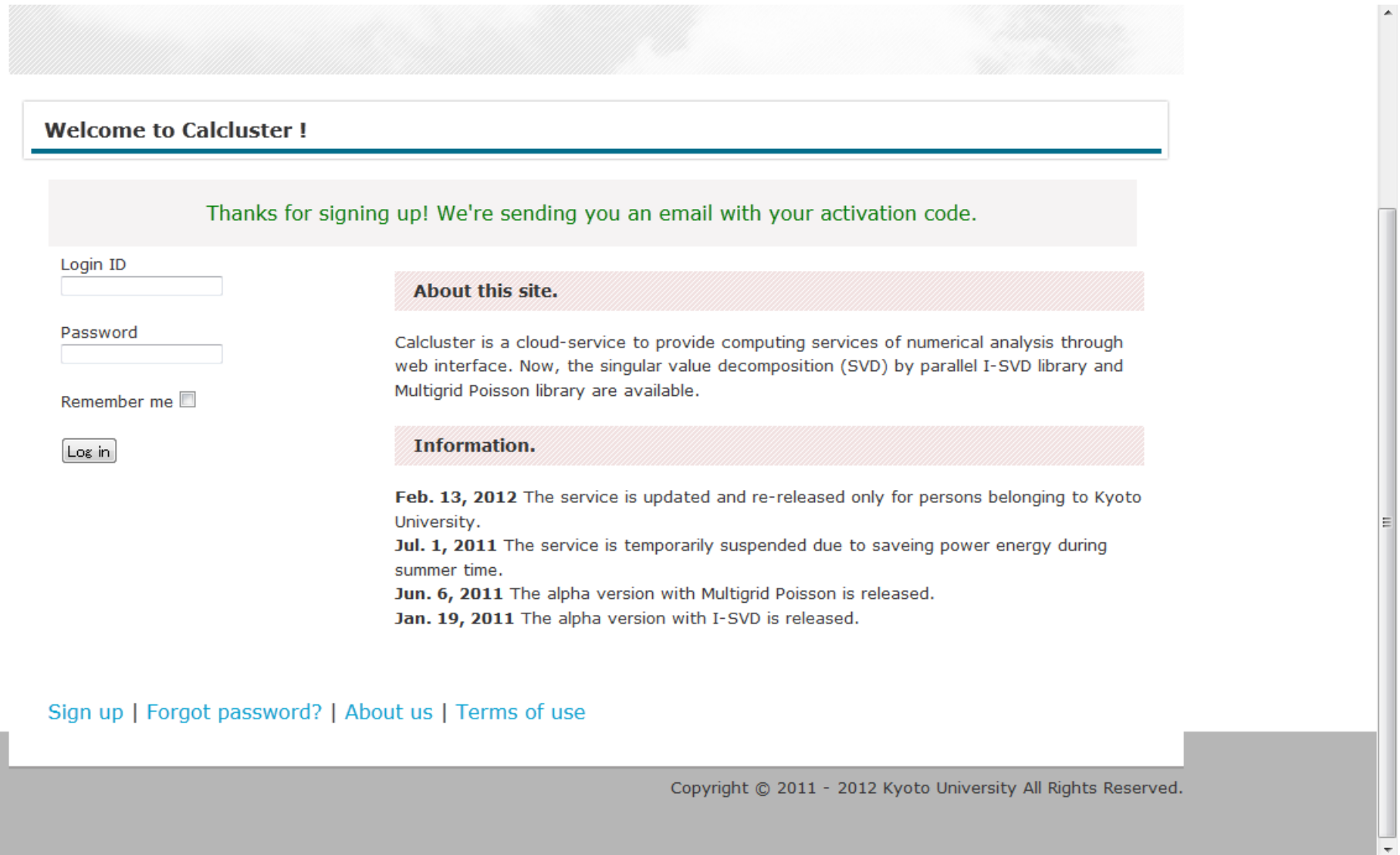
1. Calcluster の著作権は京都大学大学院情報学研究所数理工学専攻応用数学講座数理解析分野(以下、数理解析研究室と称す)に所属します。
2. Calcluster は京都大学のメールアドレス (kyoto-u.ac.jp) を正規に所有する個人のみが利用することができます。
3. Calcluster は「現状のまま」で、明示されるか暗黙のものであるかを問わず、何らの保証もな提供されません。ここで求める保証とは

← Usage agreement is displayed in here.  
English version is written below.

Sign up

Preparation is complete,  
then click here.

# Obtainment of login ID③



The screenshot shows a web page for Calcluster. At the top, there is a blurred header. Below it, a white box with a dark blue border contains the text "Welcome to Calcluster !". Underneath, a light gray box displays a green message: "Thanks for signing up! We're sending you an email with your activation code." To the left, there is a login form with fields for "Login ID" and "Password", a "Remember me" checkbox, and a "Log in" button. To the right, there are two sections: "About this site." and "Information." The "About this site." section describes Calcluster as a cloud-service for numerical analysis. The "Information." section lists several dates and updates: Feb. 13, 2012 (service updated for Kyoto University), Jul. 1, 2011 (service suspended for summer), Jun. 6, 2011 (alpha version with Multigrid Poisson released), and Jan. 19, 2011 (alpha version with I-SVD released). At the bottom, there are links for "Sign up", "Forgot password?", "About us", and "Terms of use". The footer contains the copyright notice: "Copyright © 2011 - 2012 Kyoto University All Rights Reserved."

**Welcome to Calcluster !**

Thanks for signing up! We're sending you an email with your activation code.

Login ID

Password

Remember me

**About this site.**

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**Jan. 19, 2011** The alpha version with I-SVD is released.

[Sign up](#) | [Forgot password?](#) | [About us](#) | [Terms of use](#)

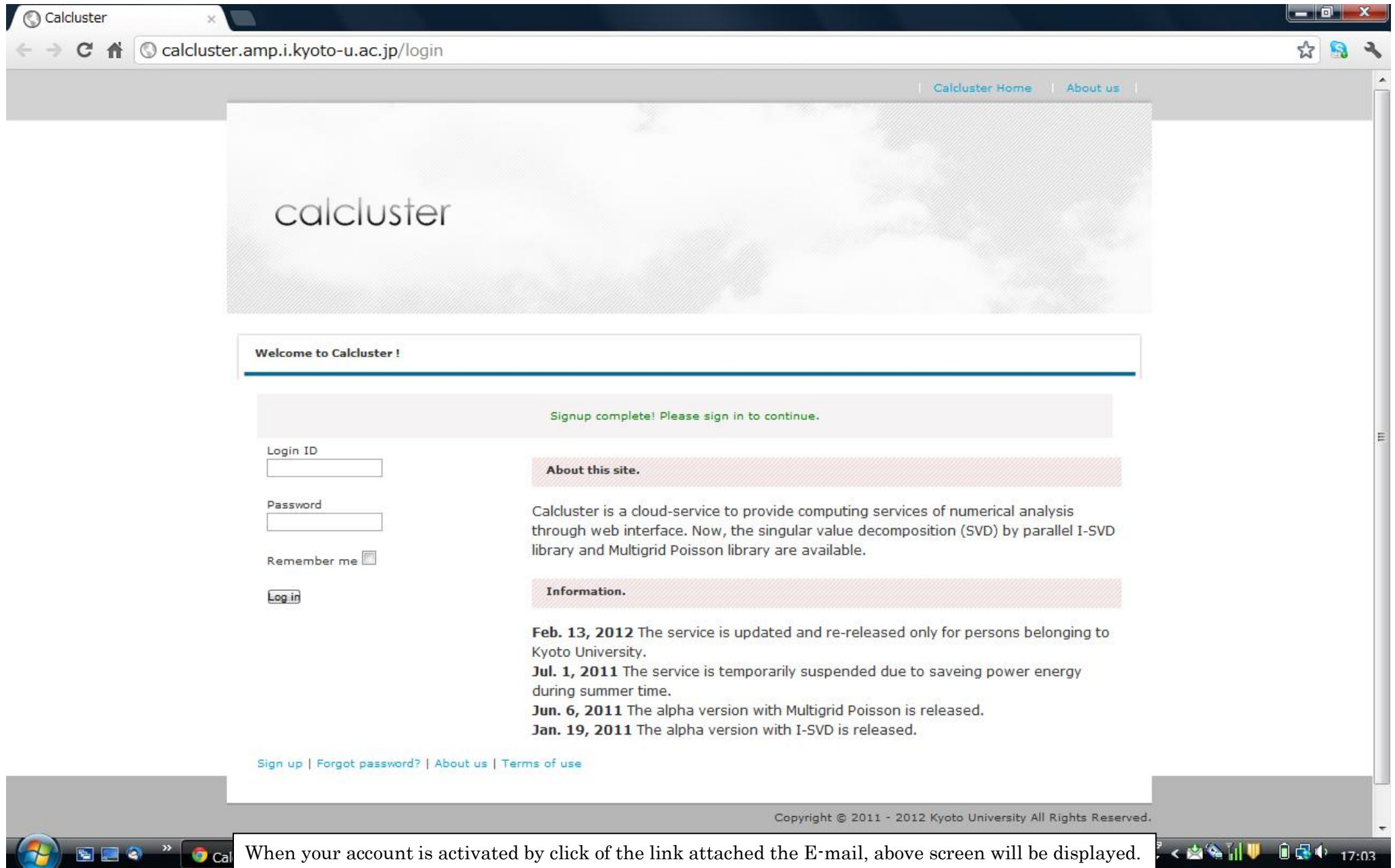
Copyright © 2011 - 2012 Kyoto University All Rights Reserved.

When you succeed to obtain your login ID,above screen will be displayed.

Then, you will receive an E-mail with title "[Calcluster] Please activate your new account".

To activate your account, click the link attached in the E-mail.

# Obtainment of login ID④



The screenshot shows a web browser window with the URL `calcluster.amp.i.kyoto-u.ac.jp/login`. The page features the Calcluster logo and a navigation bar with links for "Calcluster Home" and "About us". A green message box states: "Signup complete! Please sign in to continue." Below this, there are input fields for "Login ID" and "Password", a "Remember me" checkbox, and a "Log in" button. To the right, there are sections for "About this site." and "Information." The "Information." section lists several dates and events: "Feb. 13, 2012" (service update), "Jul. 1, 2011" (temporary suspension), "Jun. 6, 2011" (alpha version with Multigrid Poisson), and "Jan. 19, 2011" (alpha version with I-SVD). At the bottom, there are links for "Sign up", "Forgot password?", "About us", and "Terms of use". The footer contains the copyright notice: "Copyright © 2011 - 2012 Kyoto University All Rights Reserved." The Windows taskbar at the bottom shows the time as 17:03.

When your account is activated by click of the link attached the E-mail, above screen will be displayed. Moreover, you will receive an E-mail with title "[Calcluster] Your account has been activated!". Then you can use Calcluster.

# When you forget your password①

calcluster

**Welcome to Calcluster !**

Login ID

Password

Remember me

#### About this site.

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#### Information.

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[Sign up](#) | [Forgot password?](#) | [About us](#) | [Terms of use](#)

Click here.



# When you forget your password②

calcluster

## Forgot Your Password?

**Enter your email address and we'll send you a link to reset your password.**

Email

← Enter your E-mail address.

Submit

After you enter your E-mail address,  
click here.

# Main Menu screen

The screenshot shows the main menu of the calcluster application. At the top right, there are links for "Home" and "Logout". The user is logged in as "calcluster". Below the user name, there is a "HOME" link and a "Main Memu" link. A green message "Logged in successfully" is displayed. A button labeled "Manage jobs" with a gear icon is circled in red. Below the button, there is a text description: "Jobs of the registration of the job and the up-loading of the file, etc. are managed." At the bottom right, there is a copyright notice: "Copyright (C) 2011 Kyoto University All Rights Reserved."

When you success to login,above screen will be displayed.  
Click the "Manage jobs" button in red circle.



# Job List screen

calcluster

[HOME](#) > Job List

## Job List

### [Download sample files](#)

This link can download sample matrix files for I-SVD and Multigrid Poisson calculation. Please check 'README' file included in downloaded archive file.

ID	Library	Job Status	Memo	Created at	Operation
----	---------	------------	------	------------	-----------



Create a job



Copy a job

You click "Manage jobs" button in "Main Menu" screen,  
and above screen will be displayed.  
To execute singular value decomposition newly, click the "Create a job" button.

# Create Job screen

calcluster

HOME > Job List > Create Job

## Create Job

**Library**  
I-SVD

**Memo**

Create

Back

Choose "I-SVD".

Click this button after choosing I-SVD.

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You click "Create a job" button in "Job List" screen, above screen will be displayed.  
Choose "I-SVD" in Library.  
If you want to some memorandum on your job, write it in the Memo box.  
Lastly, click the "Create" button.

# Job Information screen

calcluster

HOME > Job List > Job Information

### Job Information

Job was successfully created.

#### Job Details

**Library**  
I-SVD

**Job Status**  
created  
↓  
start  
↓  
checking  
↓  
ready  
↓  
processing  
↓  
finished

**Memo**

**Processing Log**

#### Input Parameters

row	Not counted yet.	N (size of rows)
column	Not counted yet.	M (size of columns)
core	4	amount of cores

[Edit parameters](#)

#### Input Files

**Input File** Matrix text file, whose lines contain floating-point numbers of rows separated by spaces and rows are separated by breaks. It can be zipped, but the zipped file can contain only one text file.

[Upload](#) [Destroy](#) [Download](#)

uploaded.

You can [download sample input files](#). Please read 'README' in the archive.

#### Output Files

**Output File** Zip file contained 3 text files (singular values, left-singular vectors and right-singular vectors respectively). Their elements are separated by spaces.

[Download](#)

#### Operation

● [Check input files and execute calculation.](#)

[Back](#)

[reload](#)

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You click here,  
and you can download sample input matrices.

From the next page, input matrix, execution of singular value decomposition and output file are explained.

# How to make a file of an input matrix

For example, when an input matrix is

$$\begin{pmatrix} 1 & 4 & 7 & 10 \\ 2 & 5 & 8 & 11 \\ 3 & 6 & 9 & 12 \end{pmatrix},$$

then, write each element in a text file as follows.

```
1  2  3
4  5  6
7  8  9
10 11 12
```

Note that the rows and columns are transposed in the input file.

Each element in the same line in an input file should be split by space

# Input of a matrix to Calcluster①

The screenshot displays the Calcluster web interface. At the top, there are navigation links for 'Home' and 'Logout'. The main header shows 'calcluster' and a breadcrumb trail: 'HOME > Job List > Job Information'. The 'Job Information' section is highlighted with a blue underline. Below this, a green message states 'Job was successfully created.' The interface is divided into several sections: 'Job Details' on the left, 'Input Parameters' in the middle, and 'Input Files' on the right. The 'Job Details' section includes 'Library' (I-SVD), 'Job Status' (created, start, checking, ready, processing, finished), 'Memo', and 'Processing Log'. The 'Input Parameters' section shows a table with 'row' (Not counted yet, N (size of rows)), 'column' (Not counted yet, M (size of columns)), and 'core' (4, amount of cores). Below this is an 'Edit parameters' button. The 'Input Files' section shows an 'Input File' with a description: 'Matrix text file, whose lines contain floating-point numbers of rows separated by spaces and rows are separated by breaks. It can be zipped, but the zipped file can contain only one text file.' Below the description are three buttons: 'Upload', 'Destroy', and 'Download'. The 'Upload' button is circled in red. Below the buttons, it says 'uploaded.' and 'You can download sample input files. Please read 'README' in the archive.' The 'Output Files' section shows an 'Output File' with a description: 'Zip file contained 3 text files (singular values, left-singular vectors and right-singular vectors respectively). Their elements are separated by spaces.' Below this is a 'Download' button. The 'Operation' section shows a progress indicator and the text 'Check input files and execute calculation.' At the bottom right, there is a 'Back' button. At the bottom left, there is a 'reload' link. At the very bottom, there is a copyright notice: 'Copyright (C) 2011 Kyoto University All Rights Reserved.'

calcluster

HOME > Job List > Job Information

**Job Information**

Job was successfully created.

**Job Details**

Library  
I-SVD

Job Status  
created  
↓  
start  
↓  
checking  
↓  
ready  
↓  
processing  
↓  
finished

Memo

Processing Log

**Input Parameters**

row	Not counted yet.	N (size of rows)
column	Not counted yet.	M (size of columns)
core	4	amount of cores

Edit parameters

**Input Files**

**Input File** Matrix text file, whose lines contain floating-point numbers of rows separated by spaces and rows are separated by breaks. It can be zipped, but the zipped file can contain only one text file.

Upload Destroy Download

uploaded.

You can download sample input files. Please read 'README' in the archive.

**Output Files**

**Output File** Zip file contained 3 text files (singular values, left-singular vectors and right-singular vectors respectively). Their elements are separated by spaces.

Download

**Operation**

● Check input files and execute calculation.

Back

reload

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Preparation of input file is complete, then click here.

# Input of a matrix to Calcluster②

calcluster

HOME > Job List > Job Information > Upload Files

### Upload Input Files

**Job Details**

**Library**  
I-SVD

**Job Status**

created  
↓  
start  
↓  
checking  
↓  
ready  
↓  
processing  
↓  
finished

**Memo**

**Input Files**

**Input File**  
Matrix text file, whose lines contain floating-point numbers of rows separated by spaces and rows are separated by breaks. It can be zipped, but the zipped file can contain only one text file.

uploaded. Download

参照... Upload

Back

①Click this button, and designate the input file.  
The word “参照” means “reference”.

②Click this button, and the designated matrix is input to Calcluster.

You click “Uproad” button of item “Input Files” in “Job Information” screen, and above screen will be displayed.  
Click the “参照”(reference) button and designate input file.  
Then click the“Upload”button andthe input file is input to Calcluster.

# Execution of singular value decomposition①

calcluster

HOME > Job List > Job Information

### Job Information

Inputfile was successfully updated.

#### Job Details

Library  
I-SVD

Job Status  
created  
↓  
start  
↓  
checking  
↓  
ready  
↓  
processing  
↓  
finished

Memo

Processing Log

#### Input Parameters

row	Not counted yet.	N (size of rows)
column	Not counted yet.	M (size of columns)
core	4	amount of cores

Edit parameters

#### Input Files

**Input File** Matrix text file, whose lines contain floating-point numbers of rows separated by spaces and rows are separated by breaks. It can be zipped, but the zipped file can contain only one text file.

Upload Destroy Download

matrix\_3x5\_win.txt uploaded.

You can [download sample input files](#). Please read 'README' in the archive.

#### Output Files

**Output File** Zip file contained 3 text files (singular values, left-singular vectors and right-singular vectors respectively). Their elements are separated by spaces.

Download

#### Operation

● Check input files and execute calculation.

Back

reload

Click here.

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# Execution of singular value decomposition②

calcluster

HOME > Job List > Job Information

## Job Information

### Job Details

#### Library

I-SVD

#### Job Status

created  
↓  
start  
↓  
checking  
↓  
ready  
↓  
processing  
↓  
**finished**

#### Memo

#### Processing Log

Started to checking your file at Fri Feb 24 20:32:05 +0900 2012.  
File checking successfully completed at Fri Feb 24 20:32:26 +0900 2012.  
Calculation started at Fri Feb 24 20:32:28 +0900 2012. N = 3, M = 5, CPU core(s): 4  
Frobenius norm of VtV - I = 1.384177e-14  
Frobenius norm of UtU - I = 2.220446e-16  
1-Frobenius norm of A - UDVt = 5.068262e-15  
Completed.  
Calculation successfully completed at Fri Feb 24 20:32:39 +0900 2012. Time: 10.461829s.

### Input Parameters

row	3	N (size of rows)
column	5	M (size of columns)
core	4	amount of cores

Edit parameters

### Input Files

#### Input File

Matrix text file, whose lines contain floating-point numbers of rows separated by spaces and rows are separated by breaks. It can be zipped, but the zipped file can contain only one text file.

Upload

Destroy

Download

matrix\_3x5\_win.txt uploaded.

You can [download sample input files](#). Please read 'README' in the archive.

### Output Files

#### Output File

Zip file contained 3 text files (singular values, left-singular vectors and right-singular vectors respectively). Their elements are separated by spaces.

Download

### Operation

- Check input files and execute calculation.

Back

When "Job Status" becomes "finished", singular value decomposition is finished.



Information on execution of singular value decomposition is displayed.



reload

# Download of a output files of singular value decomposition①

calcluster

HOME > Job List > Job Information

## Job Information

### Job Details

#### Library

I-SVD

#### Job Status

created

↓

start

↓

checking

↓

ready

↓

processing

↓

finished

#### Memo

#### Processing Log

Started to checking your file at Fri Feb 24 20:32:05 +0900 2012.

File checking successfully completed at Fri Feb 24 20:32:26 +0900 2012.

Calculation started at Fri Feb 24 20:32:28 +0900 2012. N = 3, M = 5, CPU core(s): 4

Frobenius norm of VtV - I =

1.384177e-14

Frobenius norm of UtU - I =

2.220446e-16

1-Frobenius norm of A - UDVt =

5.068262e-15

Completed.

Calculation successfully completed at Fri Feb 24 20:32:39 +0900 2012. Time: 10.461829s.

### Input Parameters

row	3	N (size of rows)
column	5	M (size of columns)
core	4	amount of cores

Edit parameters

### Input Files

#### Input File

Matrix text file, whose lines contain floating-point numbers of rows separated by spaces and rows are separated by breaks. It can be zipped, but the zipped file can contain only one text file.

Upload

Destroy

Download

matrix\_3x5\_win.txt uploaded.

You can [download sample input files](#). Please read 'README' in the archive.

### Output Files

#### Output File

Zip file contained 3 text files (singular values, left-singular vectors and right-singular vectors respectively). Their elements are separated by spaces.

Download

You click here and you download the output file of singular value decomposition.

### Operation

- Check input files and execute calculation.

Back

reload

# Download of a output files of singular value decomposition②

The screenshot shows the 'calcluster' web interface. At the top right, there are links for 'Home' and 'Logout'. The main header displays 'calcluster' and a breadcrumb trail: 'HOME > Job List > Job Information'. Below this is a 'Job Information' section with two tabs: 'Job Details' and 'Input Parameters'. The 'Job Details' tab is active, showing a 'Library' section with 'I-SVD' and a 'Job Status' section with a vertical list of steps: 'created', 'start', 'checking', 'ready', 'processing', and 'finished'. Below the status is a 'Memo' section with a 'Processing Log' containing timestamps and technical details like 'Frobenius norm of VtV' and 'Frobenius norm of UtU'. The 'Input Parameters' tab shows a table with 'row' (3), 'column' (5), and 'core' (4). A modal dialog box is open in the center, titled '20120224203341\_471\_isvd.zip を開く'. It displays the file name, type ('ZIP ファイル'), and location ('http://calcluster.amp.i.kyoto-u.ac.jp'). It asks for processing options with three radio buttons: 'プログラムで開く(O): Lhaplus Version 1.57 (既定)', 'ファイルを保存する(S)', and '今後この種類のファイルは同様に処理する(A)'. The 'ファイルを保存する(S)' option is selected and circled in red. Below the dialog, an 'Output File' section contains a 'Download' button and a text description: 'Zip file contained 3 text files (singular values, left-singular vectors and right-singular vectors respectively). Their elements are separated by spaces.' The 'OK' button in the dialog is also circled in red. A 'Back' button is visible at the bottom right of the page.

row	3	N (size of rows)
column	5	M (size of columns)
core	4	amount of cores

20120224203341\_471\_isvd.zip を開く

次のファイルを開こうとしています:

20120224203341\_471\_isvd.zip  
ファイルの種類: ZIP ファイル  
ファイルの場所: http://calcluster.amp.i.kyoto-u.ac.jp

このファイルをどのように処理するか選んでください

プログラムで開く(O): Lhaplus Version 1.57 (既定)

ファイルを保存する(S)

今後この種類のファイルは同様に処理する(A)

OK キャンセル

①Choose this radio button.  
("ファイルを保存する" means that "save the file".)

②click this button.

Output File  
Download  
Zip file contained 3 text files (singular values, left-singular vectors and right-singular vectors respectively). Their elements are separated by spaces.

Operation  
Check input files and execute calculation.

Back

reload

Push the "OK" button after choosing "ファイルを保存する (S)" radio button which means "save the file" in the dialog box.

# Download of a output files of singular value decomposition③

Here, we explain downloaded files.

The downloaded files are compressed as zip file. Decompress this compressed file, and you have the following three files.

①left\_singular\_vectors

②singular\_values

③right\_singular\_vectors

Let us regard the data in the files ① and③ as a matrix.

Let these matrices be  $U$  and  $V^T$ , respectively.

Let  $\Sigma_r$  be a diagonal matrix which the computed singular values in the file ② are on the diagonals in descending order.

Let make a matrix

$$\Sigma = \begin{pmatrix} \Sigma_r & O \\ O & O \end{pmatrix}$$

by adding zero elements if necessary. Then, the singular value decomposition of the input matrix  $A$  is

$$A = U\Sigma V^T .$$

# Usage agreement

1. All rights of Calcluster are reserved by Applied Mathematical Analysis Laboratory, Department of Applied Mathematics and Physics, Graduate School of Informatics, Kyoto University (hereinafter referred to as "Applied Mathematical Analysis Laboratory").
2. Use of Calcluster is restricted to individuals who obtain e-mail address of Kyoto University (kyoto-u.ac.jp) through a regular procedure.
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11. The governing language of this Usage agreement shall be Japanese.