How to Use the Programs

Corresponding to the two models for binary items and items with more than two categories, two programs are prepared; EstDistriR2forBinaryMT_2 for binary items and EstDistriR2NCatGT2MT_2 for items with more than two categories. Each program can be opened by Visual Studio 2017, or its executable file (*.exe) can be run on a PC on which Visual Studio 2017 is installed.

The free version of Visual Studio 2017 (Visual Studio Community) is available at the Microsoft website

https://www.visualstudio.com/downloads/download-visual-studio-vs and some information to use Visual Studio 2017 is available at website http://y-okamoto-psy1949.la.coocan.jp/booksetc/introvcpp/On_vs2015/en/ This website explains some error messages, which can be ignored.

1. Program for Binary Items

Start the EstDistriR2forBinaryMT_2 program, then a form shown in Figure 1.1 will appear.



Figure 1.1

Click on the GO button, then the Input Data File dialogue window appears (Figure 1.2).

	> vCppPrgs > EstDistrik2rorBin	arywi1_2 > EstDistrik2forBinarywi1_	,2 >	~ O	Search EstDistrik2forBinaryM
ganize 👻 New folder					
This PC	Name	Date modified	Туре	Size	
Desktop	x64	4/2/2017 8:47 PM	File folder		
Documents	DataTable2.txt	6/25/2016 9:55 PM	Text Document	53	KB
Downloads					
Music					
Pictures					
Videos					
OS (C:)					
OurFiles (D:)					
- SmplPras (F:)					
BackUp2015 (G:)					
BackUp2015 (G:) DocsAndSoOn (I					
BackUp2015 (G:) DocsAndSoOn (I Vol-hitomi (I:)					
BackUp2015 (G:) DocsAndSoOn (I Vol-hitomi (I:) Vol-ken-ichi (J:)					
BackUp2015 (G:) DocsAndSoOn (I Vol-hitomi (I:) Vol-ken-ichi (J:) Vol-misato (K:)					

Figure 1.2

Set the input data file name. The format of the input data file is shown in Figures 1.3 and 1.4. The data file is composed of four parts, and each part begins with the line, which starts with slash / (See lines 15, 18, 22, and 25 in Figure 1.3).

DataTable2.	txt -¤ ×										
1	m = 10 n	= 500									
2											
3	mu	Lmabda	Psy								
4	0.10000	0.60000	0.80000								
5	0.10000	0.67500	0.73782								
6	0.10000	0.75000	0.66144								
7	0.10000	0.82500	0.56513								
8	0.10000	0.90000	0.43589								
9	-0.10000	0.60000	0.80000								
10	-0.10000	0.67500	0.73782								
11	-0.10000	0.75000	0.66144								
12	-0.10000	0.82500	0.56513								
13	-0.10000	0.90000	0.43589								
14											
15	/										
16	2										
17											
18	/										
19	10										
20	ID	Item-1	Item-2	Item-3	Item-4	Item-5	Item-6	Item-7	Item-8	Item-9	Item-10
21											
22	/										
23		1	1	1	1	1	1	1	1	1	1
24											
25	/										
26	1	1	2	2	1	1	2	2	1	1	1
27	2	1	2	1	1	1	1	1	1	2	1
28	3	2	2	1	1	1	2	2	1	1	1
29	4	1	1	1	1	1	1	1	1	1	1
30	5	2	2	2	2	2	2	2	2	2	2
31	6	1	1	1	1	1	1	1	2	1	1
32	7	2	1	1	1	1	1	1	1	1	1
					Fig	ure 1.3					

The next line of the first line with slash / at the head (line 15) contains the number of categories (2 categories in Figure 1.3, Line 16). In the next line (Line 19) of the second line

with slash / at the head (Line 18), the number of categorical variables is written, 10 in Line 19. In the line after this line, variable names are written (Line 20). The first name is for the case identification variable, e.g. ID in Figure 1.3. The case identification variable has a string value. In Figure 1.3, as string values, strings of digits are used. After the name of the case identification variable, those of categorical variables are lined.

After the third line with slash / at the head (Line 22), integers 0 or 1 are lined (Line 23), each digit corresponds to categorical variables in the order. 1 means that the corresponding variable is included in the analysis, and 0 means that the corresponding variable is excluded from the analysis. In the case of Figure 1.3, all variables are included in the analysis (cf. Figure 2.3).

After the fourth line with slash / at the head (Line 25), responses by persons are written in the format, in which the first is the case identification value, and the second to the last ones are responses by the person, and they are put in one line (Lines $26 \sim$).

DataTable2.t	xt-⇒×											
517	492	1	2	1	1	1	2	2	1	1	1	
518	493	2	2	2	2	2	2	2	2	2	2	
519	494	2	2	2	2	1	1	1	2	1	2	
520	495	2	1	2	1	1	2	1	2	1	1	
521	496	1	1	1	1	1	1	1	1	1	1	
522	497	1	2	1	1	1	2	1	1	1	1	
523	498	1	1	1	1	1	1	1	1	1	1	
524	499	2	1	1	1	1	1	2	1	1	1	
525	500	2	1	1	1	1	1	1	1	1	1	
526	1											
527												
528												

Figure 1.4

After the last data (Line 525), a line with slash / at the head is put to indicate the end of the data.

Set the input data file name, then click on the Open button (Figure 1.2). The Input Data File dialogue window is closed. Then an Output File dialogue window appears (Figure 1.5).

	Design Monager a Fabila (D20 D)		1 .	sol 4		1 C (D) (D)C (D)	64
-> · · T	Prgs > VCppPrgs > EstDistrik2forBir	haryWi1_2 > EstUistrik2forBinaryWi1_	23	~ C) Se	arch EstDistriR2forBinaryM	: X
ganize 🔻 New	folder						(
🦲 temp	^ Name	Date modified	Туре	Size			
🔜 TwoStepQA	x6 4	4/2/2017 8:47 PM	File folder				
CneDrive	DataTable2,txt	6/25/2016 9:55 PM	Text Document		53 KB		
This PC							
Desktop							
🗄 Documents							
🖶 Downloads							
👌 Music							
📰 Pictures							
Videos							
🛄 OS (C:)							
OurFiles (D:)							
- SmnlPras (Fr)	~						
File <u>n</u> ame: R	esults.txt						
Save as type: T	extFile (*.txt)						

Figure 1.5

Results of analysis by the program will be written on this output text file. Set a text file name, then click on the Save button (Figure 1.5). The window is closed, then the adapting stage of MCMC will start. During executing a MCMC at an adapting stage, the DispMessage form appears, which shows information about adapting MCMC (Figure 1.6). J in "Adapting-J" indicates the sequential number of the adaptation, 0 showing that the stage is the first one. K in "Prev_n_adap_para = K" shows the number of parameters, which were adjusted in the previous stage, but is set at -1 for the first one.

🖳 DispMessage	1. 19.00 - 24. 2 7.77	×
Adapting-0 Prev_n_adap_para = - : isimu(Cat) = 500/2200	-1	

Figure 1.6

Figure 1.7 shows that it represents the adapting stage 2, and the number of parameters adjusted in the previous stage 1 is 97.



Figure 1.7

Adapting stages continue until the number of adjusted parameters becomes zero. After the adaptation, the main MCMCs will start (Figure 1.8).

🔛 DispMessage	10075	×
Main-2: isimu(Cat) = 900/3000		

Figure 1.8

The main MCMCs are composed of four MCMCs, each of which is run by a thread independent of the others. After all of the threads for the main MCMCs are finished, the dialogue form shown in Figure 1.9 will appear.



Figure 1.9

If you do not want estimates of the posterior distributions of reliability coefficients, click on

the No button. The program will end at this point. Otherwise, click on the Yes button to get estimates of the posterior distributions, then calculation of samples from the posterior distributions begins. The number of samples of sets of parameters from the posterior distributions are 1,000, and are divided into 8 subgroups. For each subgroup, a thread is created, and runs simultaneously with its associated form like that in Figure 1.10.



Figure 1.10

"1/125" in Figure 1.10 means that the 1st one from the 125 samples, which are assigned to this thread, is being calculated. After all eight threads finish their calculations, the form shown in Figure 1.11 will be shown.



Figure 1.11

R**2, Alpha, and Rho_YY' denote R^2 , α , and $\rho_{YY'}$, respectively. The upper left corner of the form is shown in Figure 1.12. "kw = 0.005" is the value used in kernel smoothing as the width parameter. A too small value produces a zigzag curve.





For example, set 0.0005 as the value (Figure 1.13).







The picture displayed can be saved in a bitmap file. Click the Save button (Figure 1.12), then

🚽 File name ?							>
e ⇒ - ↑ 📘	« Prgs » VCppPrgs » EstDistriR2	forBinaryMT_2 > EstDistriR2forBinaryMT_	2 ×	5 ~	Search EstDistriR	2forBinaryM	p
Organize 🔻 Ne	w folder						8
 temp TwoStepQA OneDrive This PC Desktop Documents Doumloads Music Pictures Videos S (C:) 	Name	Date modified 4/2/2017 8:47 PM	Type File folder	Size			
 OurFiles (D:) — SmplPros (F:) 	*						
File <u>n</u> ame:	Results.bmp						- 2
Save as <u>t</u> ype:	Bitmap File (*.bmp)						
Hide Folders					Save	Cancel	

the File name dialogue window will be presented (Figure 1.15).



Set a name for the bitmap file, then click on the Save button (Figure 1.15). If the file is successfully saved, the MessageBox like that in Figure 1.16 will be shown.

	×
D:\yasuharu\www\LaCoocan\booksetc\jwuf2017\Prgs\VCppl naryMT_2\EstDistriR2forBinaryMT_2\Results.bmp was saved.	Prgs\EstDistriR2forBi
	ОК

Figure 1.16

Click the OK button.

When the Close button is clicked (Figure 1.12), the MessageBox like that in Figure 1.17 will be presented, which says that the output file, whose name was set at the beginning of the execution of the program (Figure 1.5), was saved successfully.



Figure 1.17

Click the OK button, then the box is closed and the program is finished.

Listing 1 shows the output file, whose name is shown in Figure 1.17.

Listing 1. Example of an output data file.

Input data

file...D:¥yasuharu¥www¥LaCoocan¥booksetc¥jwuf2017¥Prgs¥VCppPrgs¥EstDistriR2forBinaryMT_2¥EstDistriR2forBinaryMT_2¥DataTab le2.txt

Number of categories = 2

Va	rs.		

	Item-1	Item-2	Item-3	Item-4	Item-5	Item-6	Item-7	Item-8	Item-9	Item-10
VarSelect										
	1	1	1	1	1	1	1	1	1	1
Data(AII)										
1:	1	2	2	1	1	2	2	1	1	1
2:	1	2	1	1	1	1	1	1	2	1
3:	2	2	1	1	1	2	2	1	1	1
4:	1	1	1	1	1	1	1	1	1	1
5:	2	2	2	2	2	2	2	2	2	2
6:	1	1	1	1	1	1	1	2	1	1
7:	2	1	1	1	1	1	1	1	1	1
8:	2	1	1	2	2	1	2	2	2	2
9:	2	2	2	2	2	2	2	1	2	2
10:	1	2	1	1	1	1	1	1	1	1
491:	1	1	2	1	1	1	2	2	1	1
492:	1	2	1	1	1	2	2	1	1	1
493:	2	2	2	2	2	2	2	2	2	2
494:	2	2	2	2	1	1	1	2	1	2
495:	2	1	2	1	1	2	1	2	1	1
496:	1	1	1	1	1	1	1	1	1	1
497:	1	2	1	1	1	2	1	1	1	1
498:	1	1	1	1	1	1	1	1	1	1
499:	2	1	1	1	1	1	2	1	1	1
500:	2	1	1	1	1	1	1	1	1	1
Data(Selecte	d)									
1:	1	2	2	1	1	2	2	1	1	1
2:	1	2	1	1	1	1	1	1	2	1
3:	2	2	1	1	1	2	2	1	1	1
4:	1	1	1	1	1	1	1	1	1	1
5:	2	2	2	2	2	2	2	2	2	2
6:	1	1	1	1	1	1	1	2	1	1
7:	2	1	1	1	1	1	1	1	1	1
8:	2	1	1	2	2	1	2	2	2	2

9:	2	2	2	2	2	2	2	1	2	2		
10.	1	2	1	1	1	1	1	1	1	1		
491.	1	0	2	1	1	1	2	2 1	1	1		
492.	1	2	1	1	1	2	2	1	I	1		
493.	2	2	2	2	2	2	2	2	2	2		
494:	2	2	2	2	1	1		2	1	2		
495:	2	1	2	1	1	2	1	2	1	1		
496:	1	1	1	1	1	1	1	1	1	1		
497:	1	2	1	1	1	2	1	1	1	1		
498:	1	1	1	1	1	1	1	1	1	1		
499:	2	1	1	1	1	1	2	1	1	1		
500:	2	1	1	1	1	1	1	1	1	1		
alpha (sample) = (0. 85933					The sample v	value of α					
Adapting MCMC sta	rted: 4/2/20	017 8:55:14	4 PM			The time at w	which the ad	apting st	age started.			
Main MCMC started	: 4/2/2017	8:57:01 P	M			The time at w the main MC	which the ad MC started	apting st	age ended, and	d		
Main MCMC ended:	4/2/2017 8	:57:36 PM				The time at w	which the m	ain MCM	IC ended.			
Item-1: Item-2: Item-3: Item-4: Item-5: Item-6: Item-7: Item-8: Item-9: Item-10:	mu [0] /psy [4 mu [1] /psy [mu [2] /psy [2 mu [3] /psy [2 mu [4] /psy [4 mu [6] /psy [4 mu [6] /psy [4 mu [8] /psy [4 mu [9] /psy [4	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	4 0 2 7 9	Lambd Lambd Lambd Lambd Lambd Lambd Lambd Lambd Lambd	a[0]/ps a[1]/ps a[2]/ps a[3]/ps a[4]/ps a[5]/ps a[6]/ps a[7]/ps a[8]/ps a[9]/ps	y[0] = 0.806 $y[1] = 1.112$ $y[2] = 1.092$ $y[3] = 1.363$ $y[4] = 3.273$ $y[5] = 0.886$ $y[6] = 0.721$ $y[7] = 1.018$ $y[8] = 1.589$ $y[9] = 2.212$		Point ϵ $\mu_j/\psi_j s$	estimates of and λ_j/ψ_j s.			
Rho_YY = 0. alpha (param) = 0. R**2 = 0.	87094 86561 80624				Point the po	estimates of bint estimates	$\rho_{YY'}, \alpha, a$ of the parar	nd R^2 can be neters.	alculated from	n		
Estimation of the	posterior	distributi	ons started	: 4/2	/2017 8	:57:43 PM	The time distributi	e at whic ons starte	ch calculation cd.	n of th	e posteri	or
The 95% central po The 95% central po The 95% central po	osterior in osterior in osterior in	terval for terval for terval for	Rho_YY = [alpha = [R**2 = [0. 8517 0. 8451 0. 7967	8, 0.88 5, 0.87 4, 0.81	443] Medi 915] Medi 069] Medi	an = 0. 870 an = 0. 864 a <u>n = 0. 805</u>	00 42 44	95% CIs an the posterior	d medi distribt	ans of itions.	
Estimation of the	posterior	distributi	ons ended:	4/2/2	017 8:5	8:19 PM	The tim distribut	e at whitions ende	ich calculatio ed.	on of tl	ne poster	rior
kw = 0.005												
Mode for Rho_YY =	0. 87070					Modes der	ived from t	he curve	s estimated by	y kerne	l smooth	ing
Mode for alpha =	0.86530					with width	parameter	kw = 0.0	005.			
Mode for R**2 =	0.80530											
kw = 0.0005												
Mode for Rho_YY =	0. 87130					Modes da	rived from	the curve	e estimated h	w kern	al smooth	ina
Mode for alpha =	0.86560					with width	narameter	$b_{M} = 0$		y KUIIG	- 511000	mg
Mode for R**2 =	0.80590					with width	Parameter	$\kappa w = 0.$				
						L						
kw = 0.005												
Mode for Rho_YY =	0. 87070					Modes do	ived from t	he ourse	s estimated h	v korno	1 smooth	ing
Mode for alpha =	0.86530					with width	narameter	$k_{W} = 0$	0.05	y KUIIC	1 3110001	шg
Mode for Rho_c =	0. 80530						runneter	0.				

2. Program for items with more than two categories

Start the EstDistriR2NCatGT2MT_2 program, then a form shown in Figure 2.1 will appear.



Figure 2.1

Click on the GO button, then the Input Data File dialogue window appears (Figure 2.2).

	· · · · · · · · · · · · · · · · · · ·		T.S.	• 0	
ganize 🔻 New folder					E • 🛄 (
This PC	Name	Date modified	Туре	Size	
Desktop	x64	4/2/2017 8:39 PM	File folder		
🗄 Documents	DataCat5del3.txt	9/5/2013 10:16 PM	Text Document	10	KB
🖶 Downloads					
👌 Music					
Pictures					
Videos					
OS (C:)					
OurFiles (D:)					
SmplPrgs (F:)					
BackUp2015 (G:)					
DocsAndSoOn (I					
🕳 DocsAndSoOn (l 🚘 Vol-hitomi (l:)					
DocsAndSoOn (I Vol-hitomi (I:) Vol-ken-ichi (J:)					
DocsAndSoOn (Vol-hitomi (l:) Vol-ken-ichi (J:) Vol-misato (K:)					

Figure 2.2

Set the input data file name. The format of the input data file is shown in Figures 2.3 and 2.4. The data file is composed of four parts, and each part begins with the line, which starts with

Da	taCat5del	3.txt	+ X	Form1.h	Form	1.h [Design]	Dat	aNCat6GradLmbd_1.txt
	1							
	2	1						
	3	5						
	4							
	5	1						
	6	5						
	7		ID	Item-1	Item-2	Item-3	Item-4	Item-5
	8							
	9	1						
	10			1	1	0	1	1
	11							
	12	1						
	13		1	2	3	3	2	2
	14		2	5	2	5	5	4
	15		3	3	1	1	1	1
	16		4	1	2	1	1	4
	17		5	3	2	1	5	4

slash / (See lines 2, 5, 9, and 12 in Figure 2.3).

Figure 2.3

The next line of the first line with slash / at the head (line 2) contains the number of categories (5 categories in Figure 2.3, Line 3). In the next line (Line 6) of the second line with slash / at the head (Line 5), the number of categorical variables is written, 5 in Line 6. In the line after this line, variable names are written (Line 7). The first name is for the case identification variable, e.g. ID in Figure 2.3. The case identification variable has a string value. In Figure 2.3, as string values, strings of digits are used. After the name of the case identification variable, those of categorical variables are lined.

After the third line with slash / at the head (Line 9), integers 0 or 1 are lined (Line 10), each digit corresponds to categorical variables in the order. 1 means that the corresponding variable is included in the analysis, and 0 means that the corresponding variable is excluded from the analysis. In the case of Figure 2.3, Item-1, Item-2, Item-4, and Item-5 are included in the analysis. Item-3 is excluded from the analysis.

After the fourth line with slash / at the head (Line 12), responses by persons are written in the format, in that the first is the case identification value, and the second to the last one are responses by the person, and they are put in one line (Lines 13 \sim).

DataCat5del3.	txt ⇒ × F	orm1.h	Form1.h	[Design]	DataN	Cat6GradLmbd_1.txt	
198	186	1	4	1	3	2	
199	187	3	1	1	1	2	
200	188	2	3	3	1	3	
201	189	4	3	4	2	4	
202	190	4	4	5	4	5	
203	191	2	4	4	2	5	
204	192	5	2	3	5	4	
205	193	2	1	2	2	1	
206	194	2	2	4	5	3	
207	195	4	3	3	4	4	
208	196	4	4	3	3	5	
209	197	3	3	3	4	5	
210	198	3	2	1	2	2	
211	199	1	4	4	2	4	
212	200	4	3	2	2	5	
213	/						
214							

Figure 2.4

After the last data (Line 212), a line with slash / at the head is put to indicate the end of the data.

Set the input data file name, then click on the Open button (Figure 2.2). The Input Data File dialogue window is closed, then an Output File dialogue window appears (Figure 2.5).

🙀 Output File								×
↔ → - ↑	« Prg	gs > VCppPrgs > EstDistriR2NCat	tGT2MT_2 > EstDistriR2NCatGT2MT_i	2 >	~	5	Search EstDistriR2NCatGT2M.	<i>م</i> .
Organize 🕶 Ne	w folde	er						?
 temp TwoStepQA OneDrive This PC Desktop Documents Downloads Music Pictures Videos OS (C:) 	Ŷ	Name x64 DataCat5del3.txt	Date modified 4/2/2017 8:39 PM 9/5/2013 10:16 PM	Type File folder Text Document	Siz	e 10 ł	(B	
SmnlPros (F-) File <u>n</u> ame:	↓ Result	s.txt						- 1
Save as <u>t</u> ype:	TextFi	le (*.txt)						- 14
 Hide Folders 							Save Cance	el 🛛

Figure 2.5

Results of analysis by the program will be written on this output text file. Set a text file name, then click on the Save button (Figure 2.5). The adapting stage of MCMC will start.

During executing an MCMC for the adapting stage, the DispMessage form appears, which shows information about adapting MCMC (Figure 2.6). J in "Adapting-J" indicates the sequential number of the adaptation, 0 showing that the stage is the first one. K in "Prev_n_adap_para = K" shows the number of parameters, which were adjusted in the previous stage, but is set at -1 for the first one.

💀 DispMessage	1	×
Adapting-0 Prev_n_adap_para = -1 : isimu(Cat) = 700/2500		

Figure 2.6

Figure 2.7 shows that it represents the adapting stage 2, and the number of parameters adjusted in the previous stage 1 is 12

💀 DispMessage	1000	×
Adapting-2 Prev_n_adap_para = 12 : isimu(Cat) = 1620/2500		

Figure 2.7

Adapting stages continue until the number of adjusted parameters becomes zero. After the adaptation, the main MCMCs will start (Figure 2.8).

💀 DispMessage	~	×
Main-2: isimu(Cat) = 900/3000		

Figure 2.8

The main MCMCs are composed of four MCMCs, each of which is run by a thread

independent of the others. After all of the threads for the main MCMCs are finished, the dialogue form shown in Figure 2.9 will appear.

• •• •	CheckForm			×
.9	Do you need the poster Yes or No ?	rior distributions	3 ?	
1	Yes	No		
				//

Figure 2.9

If you do not want estimates of the posterior distributions of reliability coefficients, click on the No button. The program will end at this point. Otherwise, click on the Yes button to get estimates of the posterior distributions, then calculation of samples from the posterior distributions begins. The number of samples of sets of parameters from the posterior distributions are 1,000, and are divided into 8 subgroups. For each subgroup, a thread is created, and runs simultaneously with its associated form like that in Figure 2.10.



Figure 2.10

"14/125" in Figure 2.10 means that the 14^{th} one from the 125 samples, which are assigned to this thread, is being calculated. After all eight threads finish their calculations, the form shown in Figure 2.11 will be shown.



Figure 2.11

R**2, Alpha, Rho_YY', and Rho_w denote R^2 , α , $\rho_{YY'}$, and ρ_{ω} respectively. The upper left corner of the form is shown in Figure 2.12. "kw = 0.005" is the value used in kernel smoothing as the width parameter. A too small value produces zigzag curves.



Figure 2.12

For example, as the value, set 0.01 larger than 0.005 (Figure 2.13) to make the curves smoother.



Figure 2.13



Then, click on the Draw button. Smooth curves are obtained (Figure 2.14).

Figure 2.14

The picture displayed can be saved in a bitmap file. Click the Save button (Figure 2.12), then the File name dialogue window will be presented (Figure 2.15).

→ · · · · · · · · · · · · · · · · · · ·	F2MT_2 > EstDistriR2NCatGT2MT	_2 >	5 V	Search EstDistriR2NCatGT2	И Ј
rganize 🔻 New folder				EEE 🔹	(
i temp Name TwoStepQA is x64 OneDrive This PC Desktop Documents Downloads Music Pictures Videos Sources O O(C:)	Date modified 4/2/2017 8:39 PM	Type File folder	Size		
SmnIPras (Fr)					
File name: Results.bmp					
Save as type: Ritman File (* hmn)					

Figure 2.15

Set a name for the bitmap file, then click on the Save button (Figure 2.15). If the file is successfully saved, the MessageBox like that in Figure 2.16 will be shown.

	×
D:¥yasuharu¥www¥LaCoocan¥booksetc¥jwuf2017¥Prgs¥VCppPrgs¥EstDistriR2NC atGT2MT_2¥EstDistriR2NCatGT2MT_2¥Results.bmp was saved.	
OK	

Figure 2.16

Click the OK button. If the Close button is clicked (Figure 2.12), the MessageBox like that in Figure 2.17 will be presented, which says that the output file, whose name was set at the beginning the execution of the program (Figure 2.5), was saved successfully.

	×	
D:¥yasuharu¥www¥LaCoocan¥booksetc¥jwuf2017¥Prgs¥VCppPrgs¥EstDistriR2NC atGT2MT_2¥EstDistriR2NCatGT2MT_2¥Results.txt was saved.		
OK		

Figure 2.17

Click the OK button, then the box is closed and the program is finished.

Listing 2 shows the output file, whose name is shown in Figure 2.17.

Listing 2. Example of an output data file.

Number of categories = 5

Input data file...D:¥yasuharu¥www¥LaCoocan¥booksetc¥jwuf2017¥Prgs¥VCppPrgs¥EstDistriR2NCatGT2MT_2¥EstDistriR2NCatGT2M T_2¥DataCat5del3.txt

```
Vars...
             Item-1
                       Item-2
                                 Item-3
                                           Item-4
                                                    Item-5
VarSelect...
                  1
                            1
                                     0
                                               1
                                                         1
Data(AII)...
                                     3
       1:
                  2
                            3
                                               2
                                                         2
                            2
                                               5
       2:
                  5
                                     5
                                                         4
       3:
                  3
                            1
                                     1
                                               1
                                                         1
                            2
       4:
                  1
                                     1
                                               1
                                                         4
       5:
                  3
                            2
                                               5
                                                         4
                                     1
       6:
                  1
                            3
                                     2
                                               3
                                                         3
```

7:	4	3	1	2	4
8:	3	4	2	3	1
9:	4	2	2	1	3
10:	3	5	3	4	5
191:	2	4	4	2	5
192:	5	2	3	5	4
193:	2	1	2	2	1
194:	2	2	4	5	3
195:	4	3	3	4	4
196:	4	4	3	3	5
197:	3	3	3	4	5
198:	3	2	1	2	2
199:	1	4	4	2	4
200:	4	3	2	2	5
Data(Selected	I)				
1:	2	3	2	2	
2:	5	2	5	4	
3:	3	1	1	1	
4:	1	2	1	4	
5:	3	2	5	4	
6:	1	3	3	3	
7:	4	3	2	4	
8:	3	4	3	1	
9:	4	2	1	3	
10:	3	5	4	5	
191:	2	4	2	5	
192:	5	2	5	4	
193:	2	1	2	1	
194:	2	2	5	3	
195:	4	3	4	4	
196:	4	4	3	5	
197:	3	3	4	5	
198:	3	2	2	2	
199:	1	4	2	4	
200:	4	3	2	5	
alpha (sample	e) = 0.71231				The sample va
NS i mumeme / Ada	ntive - 2500)			1
NO HIUIIGIIG/ Auz	iptive – 2000	,			
Adopting MCMC	atortod: 20	17/04/02	20.02.10		The time at whi
Audpting mome	Starteu. 20	117/04/02	20.03.10		
Main MCMC sta	urted: 2017/	(04/02 20:	04:25		The time at whi
		.,			
Main MCMC end	led: 2017/04	/02 20:04	:42		The time at whi
	·				L
Item-1:	mu[0] =	0. 048	La	ambda[0] =	0. 706
Item-2:	mu[1] =	-0.049	La	ambda[1] =	0. 604
Item-4:	mu[2] =	-0.016	La	ambda[2] =	0. 671

alue of α

ich the adapting stage started.

ich the adapting stage ended, and C started.

ich the main MCMC ended.

S04 SgmE[1] = 0.765 A 571 SgmE[2] = 0.756 A	μ_j S, λ_j S, and ψ_j S.
---	---

Г

```
mu[3] = -0.011
Item-5∶
                                             Lambda[3] = 0.620
                                                                            SgmE[3] = 0.818
CBndry[0] = -1.00000
CBndry[1] = -0.32775
                                                   Point estimates of C_ks.
CBndry[2] = 0.32125
CBndry[3] = 1.00000
Rho_w
              = 0.74054
                                                 Point estimates of 
ho_{\omega} , 
ho_{YY'} , lpha , and R^2 calculated
Rho_YY
              = 0.71087
alpha (param) = 0.71003
                                                  from the point estimates of the parameters.
              = 0.70449
R**2
Estimation of the posterior distributions started: 2017/04/02 20:04:46
                                                      The time at which calculation of the posterior distributions started.
The 95% central posterior interval for Rho_w = [0.66437, 0.79416]
                                                                            Median = 0.73591
The 95% central posterior interval for Rho_YY = [0.63363, 0.76583]
                                                                            Median = 0.70562
                                                                                                95% CIs and medians of
The 95% central posterior interval for alpha = [0.63124, 0.76463]
                                                                            Median = 0.70245
                                                                                                the posterior distributions.
The 95% central posterior interval for R**2 = [0.63009, 0.75478]
                                                                            Median = 0.69894
Estimation of the posterior distributions ended: 2017/04/02 20:05:38
                                                     The time at which calculation of the posterior distributions ended.
kw = 0.005
Mode for Rho_w = 0.73750
                                                     Modes derived from the curves estimated by
Mode for Rho_YY = 0.70550
                                                     kernel smoothing with width kw = 0.005.
Mode for alpha = 0.70350
Mode for R**2 = 0.70050
```

kw = 0.01 Mode for Rho_w = 0.73950 Mode for Rho_YY = 0.70850 Mode for alpha = 0.70550

Mode for R**2 = 0.70350

Modes derived from the curves estimated by kernel smoothing with width kw = 0.01.