

Table of Contents

Mathematica and Excel - Data Exchange and Control	1
Abstract	1
Table of Contents	2
Introduction	8
Software Used for this investigation	10
Style Sheet Used	10
Disclaimer	10
Copyright Notice	11
Data Exchange via Clipboard	12
Introduction	12
Table of Contents	13
Mathematica Clipboard Commands	14
Introduction	14
<i>Mathematica</i> Interactive Clipboard commands	15
<i>Mathematica</i> "CopySpecial" Formats	15
<i>Mathematica</i> "PasteSpecial" Formats	16
Mathematica (Ctrl+C) → Clipboard → Mathematica (Paste) ...	17
<i>Mathematica</i> FrontEnd Clipboard commands	17
Introduction	17
FrontEndToken Programming	17
NotebookPut	18
ClipboardNotebook[]	19
NotebookPut using the ClipboardNotebook[]	21
NotebookWrite using the ClipboardNotebook[]	22
Clearing the Clipboard	24
ClipboardNotebook[] to the System Clipboard	25
myClipboardNotebook[]	25
Systematic analysis	27
Comparing the clipboard content for different CopySpecial parameters	27
Comparing the ClipboardNotebook content for different CopySpecial parameters	27
Helper Formatted Cells	29
Helper Copy/Paste Functions	29
Formatted Text cells: Copy(Special) / Paste(Special) using different Copy / Paste parameters	30
Using "EMF"	33
Mathematica (Ctrl+C) → Clipboard → Excel (Paste)	33
Introduction	33
Part of a Plain Text Cell	34

Plain Text Cell	35
Part of a Formatted Text Cell	35
Formatted Text Cell	35
Text with Style Sheet	35
Numbers	36
Mathematical Expression	36
Copy As MathML	36
Two cells	37
Plot	37
Table	38
Excel (Ctrl+C) → Clipboard → <i>Mathematica</i> (Ctrl+V)	38
Introduction	38
Part of a Formatted Excel Cell	39
Formatted Text Cell	40
Numbers	40
Range	41
Formulas	41
Chart	41
VBA Code	42
Conversion of Tables	42
Introduction	42
Excel Ctrl+C and <i>Mathematica</i> Paste As...	43
Horizontal List	43
Vertical List	44
2 Dimensional List	45
Conversion Functions	46
Conversion from $\{\{a,b\},\{c,d\}\}$ to "a\tb\nc\td"	46
Conversion from "a\tb\nc\td" to $\{\{a,b\},\{c,d\}\}$	48
Put the <i>Mathematica</i> table to the Clipboard	49
Get the table from the Clipboard	50
Round Trip	50
Clipboard Palette	51
Introduction	51
Help Button	51
Help for the ClipboardPalette.nb	51
Paste the Help into the Palette	52
To Build the Clipboard Palette	53
To Make a Standalone Palette	56
Clipboard and JLink	56
Introduction	56
Preparatory Steps	57
InstallJava	57
Toolkit	58
32 Flavors of "Hello" (using Copy)	59
1 Flavor of "Hello" (using CopySpecial "EMF")	64
32 Flavors of a <i>Mathematica</i> Plot (using Ctrl+C)	64
57 Flavors of an Excel 2x2 Table (using Ctrl+C)	65

Data Exchange via File	66
Introduction	66
Table of Contents	66
Excel file formats	67
$Mathematica$ file formats	68
$Mathematica$ file formats for textual and numerical data	68
Introduction	68
"Table", "CSV" and "TSV"	70
Setting the suboption "TableSeparators"	70
Export of a List, a Table and a List of Tables	71
"Text", "String"	71
Roundtrip - Import an Exported Table	72
Excel tabular data via .txt , .csv , .tsv , .dat	73
Introduction	73
Results	74
$Mathematica$ Export → .txt , .csv , .tsv , .dat → Excel Open	75
Export the table $\{\{A,B\},\{C,D\}\}$	75
Two Methods for Adding Column and Row Headings	76
Excel Save As → .txt , .csv → $Mathematica$ Import	76
Introduction	76
First Step: Save As in Excel	76
Second Step: Import in $Mathematica$	78
Third Step: ToExpression	79
Excel Formulas via .csv , .txt	80
Introduction	80
Excel Save As (in formula view) → .xls , .csv	81
.xls , .csv → $Mathematica$ Import (as Text)	81
Introduction	81
XLS	82
CSV	82
Formula string → Formula expression	82
Conversion using pattern matching	83
Conversion using position information	85
$Mathematica$ Export → .csv , .xls → Excel Open	86
CSV file	86
XLS	86
Excel tabular data via .xls	87
Introduction	87
$Mathematica$ Export → .xls → Excel	88
Roundtrip within $Mathematica$	88
Size of an .xls file	88
Transferring list, tables, ... of symbols to Excel	89
Transferring Numbers to Excel	89
Excel → .xls → $Mathematica$ Import	90
Transfer of text and numbers	90
Transfer of formatted numbers	90

.xls File size	90
What you can't transfer	91
XLS file with three Worksheets	91
Excel Workbooks via .xml	92
Introduction	92
Excel .xml Support	94
Introduction	94
Save As .xml	94
Open .xml	94
Structure of an .xml spreadsheet	94
Objects not exported to an .xml file (Excel 2002)	96
<i>Mathematica</i> .xml Support	96
Outline of the <i>Mathematica</i> XML capabilities	96
The XML capabilities we need	97
Export and Import as XML	97
Excel Save As → .xml → <i>Mathematica</i> Import (as XML)	98
Transfer of Workbook information	98
Extracting information using String Matching	99
Extracting information using Expression Matching	102
<i>Mathematica</i> Export (...) → .xml → Excel Open	103
Export as XML	103
Export as XML and ConversionOptions	103
Export as Text	104
Export as Text in the XMLSS format	104
Excel Charts via .jpg,.gif	106
Introduction	106
<i>Mathematica</i> Export → .gif or .jpg → Excel Insert	107
Excel Macro (for Chart export) → .gif or .jpg → <i>Mathematica</i> Import	107
Excel Macros via .bas	108
Introduction	108
Excel Macro → .bas → <i>Mathematica</i> Import (as Text)	109
<i>Mathematica</i> Export → .bas → Excel import in VBE	109
Data Exchange and Control via NETLink	111
Introduction	111
Launching the .NET runtime	112
Commands	112
Details	112
NETLink commands	113
Loaded assemblies	113
Calling COM from <i>Mathematica</i>	113
Introduction	113
Technique 1 - Automation, Late Binding, Dispatch	114
Technique 2 - Interop Assembly, Early Binding	115
Creating an Interop Assembly	115
Downloading a Primary Interop Assembly	116
Using an Interop Assembly	116

ReleaseCOMObject	117
CastNETObject	118
Handling COM events	119
Displaying visual COM objects (Active X Controls)	120
.NET commands to get Information on loaded NET objects, types, assemblies	121
Excel functions overview	121
NETTypeInfo	122
Excel and Office Documentation	123
Function Prototype	124
Prototype implementation of a function	124
Using the Prototype implementation	125
Not using the prototype implementation	125
Interactive Control	126
Application	127
Workbooks	127
Worksheets	127
Write and Read values	128
Count Workbooks and Worksheets	128
Start Excel	128
Commands	128
Details	129
Quit Excel (and garbage collection)	130
Commands	130
Details	130
Application@Quit	130
Workbooks@Close	130
No garbage collection	131
Garbage collection using NETBlock	131
Garbage collection using BeginNETBlock and EndNETBlock	132
Add a Workbook and Worksheets	133
Commands	133
Details	133
Available commands for Workbooks objects	134
Available commands for Workbook objects	135
Add a Worksheet	135
Commands	135
Details	135
Available commands for Sheets	137
Available commands for Worksheet	139
Read and Write the content of an individual Cell or Range	139
Commands	140
Details	140
More on Value2 and Value[]	141
More on Range objects	142
Add a Chart	142

Commands	142
Details	142
Embed a chart in the worksheet	143
Create a separate chart sheet	144
More Info on the Chart object	146
Further commands	146
Find a file	147
Open an Input Box	147
Summary of Important Commands	147
Appendix	149
Other Methods	149
Introduction	149
Reading .xls Using a Java API	149
http://www.andykhan.com/jexcelapi/	149
http://jakarta.apache.org/poi/hssf/	150
Run Excel to convert from .xls to .xml	150
OpenOffice.org Calc	150
Insert Object Menu Item	150
NETLink	150
Initialization and System Dependent Code	151
Introduction	151
Directory of Excel files	151
Directory of Interop Assembly	151
Produce small output	151
Notebook Option Settings	151