

# R与MATLAB及VBA混合编程

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# Why

R是一款功能强大的能够进行统计研究、数据分析的得力工具。不仅免费、开源，而且算法更新速度快。

Excel是最为广泛使用的交互式表格，在商务办公领域有着无可比拟的市场占有率。

VBA是Excel高阶使用者的得力助手，能够批量化的操作提供工作效率。

MATLAB是由MathWorks公司推出的科学计算语言，其向量化的思想与R相同。

Why R

Why Excel

Why VBA

Why MATLAB

# 混合编程

每种工具各有所长通过混合编程进行交互显得尤为重要。

搭配种类繁多，而内容又不复杂，几乎找不到制定的书籍。

通过搜索等方式学习混合编程需要很大的学习成本。

在讲座中很容易当场消化理解。

接口、Server、插件

创建对象

建立连接

数据及变量传递

代码传递运行

断开连接

# 背景介绍

网址: <http://rcom.univie.ac.at/>

statconn

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## Powerful data analysis from inside your favorite application

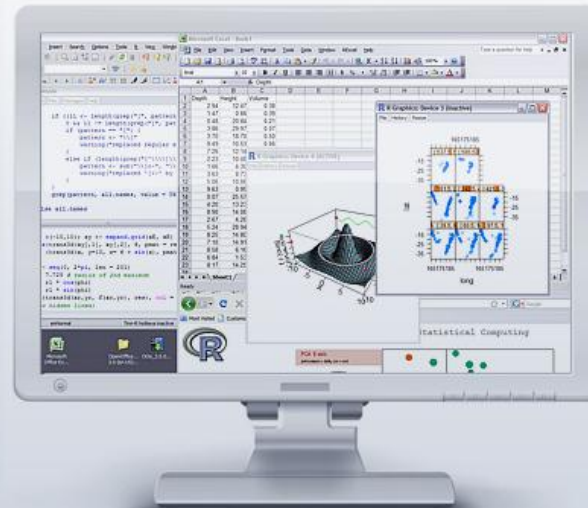
Statconn projects and programs provide the software infrastructure for application integration and have enabled powerful data analysis and visualization functionality in many rather diverse applications.

Our components and applications for seamless integration allow to embed statistics software from the [R project](#) and data analysis and computation services from [Scilab](#) into applications on Microsoft Windows, MacOS X and Linux.

Application connectors for MS Office (*RExcel* and *SWord*) and OpenOffice.org (*ROOo*) provide integration solutions for users and application builders. We have a [video demonstration](#) of what can be accomplished with *RExcel*.

The background technology is available as a set of components for all platforms to easily build custom applications based on the powerful data analysis and graphics toolboxes from R and Scilab. We support a wide range of different languages (e.g., VBA, VB, C#, C++, Python, Java) and different technology platforms (COM/DCOM, .NET, Uno, C, Web Services SOAP/http) to build and integrate solutions.

All these products are available free of charge for download (from our site only). To redistribute our products or technologies in your products or solutions, do contact us. Please study the accompanying license files carefully to find out restrictions on using the products free of charge.



[www.statconn.com](http://www.statconn.com)

# Statconn Project

他们所做的项目不仅仅局限于 RExcel，而是提供各种工具使得 R 可以与其他工具混合使用。Rexcel 只是这些工具之一。

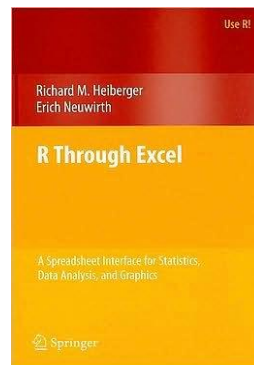
statconnDCOM server

statconnWS SOAP/http web service

rcom R package

RExcel

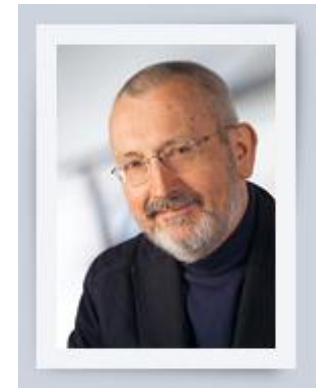
SWord



**Thomas Baier**



**Erich Neuwirth**



# IStatConnector

何为COM?

——The Component Object Model  
组件对象模型

**statconnDCOMServer** 相当于一个  
软件服务端，可以使R与其他软件  
融合。

**rcom** 是一个R包，可以使R与其他  
应用程序同时、交互运行

**RExcel** 是一个利用用前两者使  
Excel能够调用R的加载项

建立COM对象

初始化R

SetSymbol

Evaluate, EvaluateNo  
Return

GetSymbol

关闭R

释放COM对象



# R与MATLAB



# MATLAB DEMO

```
R_Obj=actxserver('StatConnectorSrv.StatConnector');
```

```
R_Obj.Init('R');
```

```
R_Obj.SetSymbol('e',rand([1,100]));
```

```
R_Obj.SetSymbol('x',1:100);
```

```
R_Obj.EvaluateNoReturn('y <- 3*x+e')
```

```
R_Obj.EvaluateNoReturn('lm.sol <-lm(y~x)')
```

```
R_Obj.EvaluateNoReturn('z<-lm.sol$coef')
```

```
MATLABcoef=R_Obj.GetSymbol('z')
```

```
R_Obj.Evaluate('as.vector(lm.sol$coef)')
```

```
R_Obj.Evaluate('f<-is.vector(x)') %FALSE
```

```
R_Obj.Evaluate('f<-is.array(x)') %TRUE
```

- R\_Obj=actxserver('StatConnectorSrv.StatConnector');

- R\_Obj.Init('R');

- R\_Obj.SetSymbol('e',rand([1,10]));

- R\_Obj.SetSymbol('x',1:10);

- *R\_Obj.EvaluateNoReturn('x<-as.vector(x)')*

- *R\_Obj.EvaluateNoReturn('e<-as.vector(e)')*

- R\_Obj.EvaluateNoReturn('y <- 3\*x+e')

- R\_Obj.EvaluateNoReturn('lm.sol <-lm(y~x)')

- R\_Obj.EvaluateNoReturn('z<-lm.sol\$coef')

- MATLABcoef=R\_Obj.GetSymbol('z')

- MATLAB\_Coef=R\_Obj.Evaluate('lm.sol\$coef')

- R\_Obj.Close

# MATLAB的R-link

MathWorks公司在2004年的时候就推出了R-link这一工具，提供m文件的免费下载。R-link包括以下函数：

**openR** - Connect to an R server process.

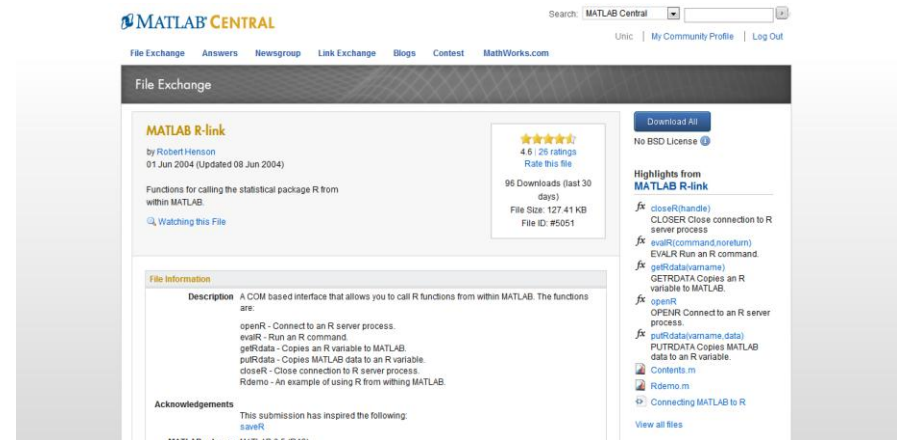
**evalR** - Run an R command.

**getRdata** - Copies an R variable to MATLAB.

**putRdata** - Copies MATLAB data to an R variable.

**closeR** - Close connection to R server process.

个人觉得除了可以使MATLAB编程中代码短一点，并没有必要使用这个工具，它只是把对COM对象的操作写到了函数里而已。



- 网址：
- <http://www.mathworks.com/matlabcentral/fileexchange/5051-matlab-r-link>



# R与EXCEL VBA

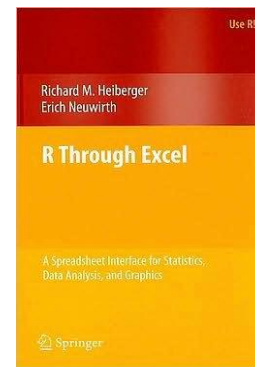
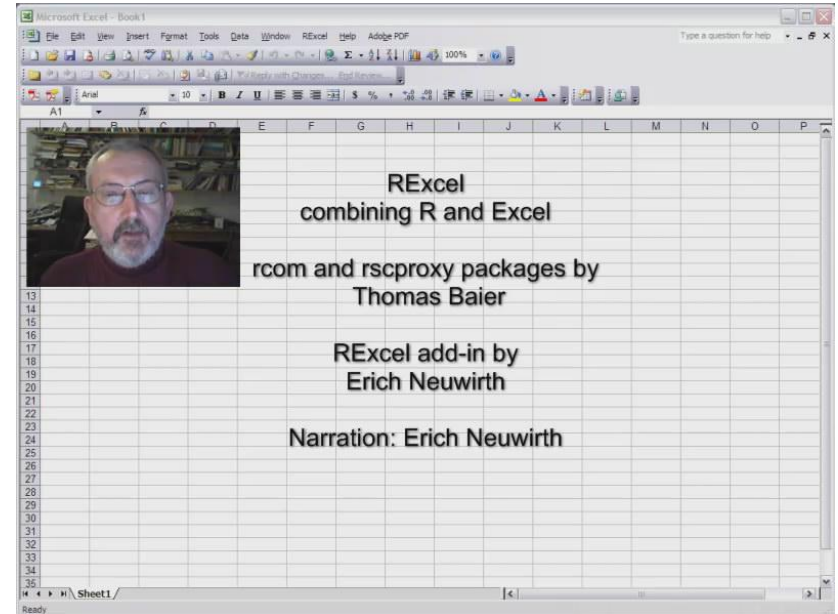
# R与Excel

R与Excel的交互可以说是statconn最为重视的部分，因为是最容易被广泛使用的工具。官网上提供了一个Demo的教学视频，可以保存成MP4的文件自己慢慢学习。

R through Excel是一本专门讲解RExcel的书，不过没有VBA部分的讲解。

在useR的会议slides里面也可以下载到一些有用的资料。

由于两位作者经常从事Rexcel及statconn的收费培训工作，所以很多资料无法得到。



<http://www.statconn.com>

**Course times**  
Thursday June 2, 9:00-17:00  
Friday June 3, 9:00-17:00

**Booking**  
The course fee is €1200, including lunch and coffee during the breaks, and the dinner with the wine tasting at the first evening. Details on how to pay depend on the country you live in. You will get the information via email when you register.

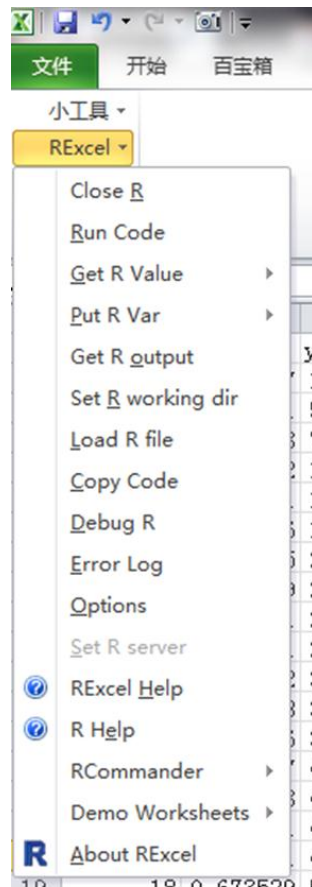
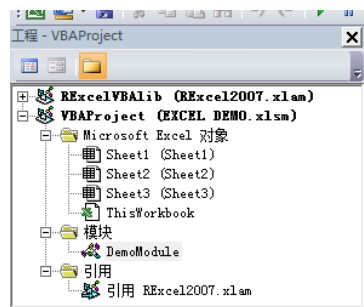
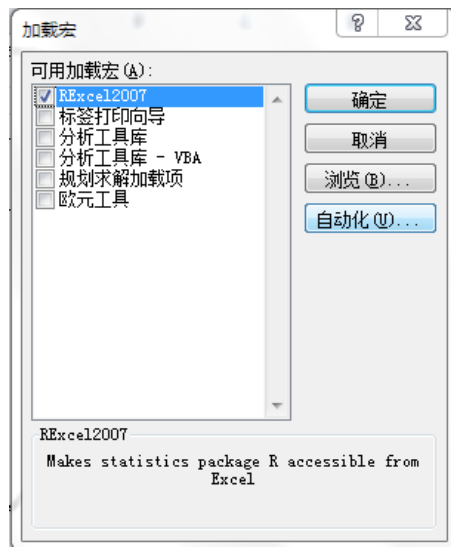
Until April 15 you can register for the course by sending email to [courses@statconn.com](mailto:courses@statconn.com).

The hotel has single and double rooms are available. Single rooms are approx. €60, double rooms are approx. €80 per night, and breakfast is included. Participants are expected to make the hotel reservation on their own behalf. We have reserved rooms for the course, so you should quote the course when making your reservation.

# 准备工作

为了使用Rexcel，需要在加载项中  
价值Rexcel，会看到Rexcel的插件  
菜单。可以实现Spreadsheet与R的  
交互使用。

如果使用VBA，在VBE编辑器里直  
接拖动RExcelVBA Lib即可实现对  
RExcel2007.xlam的引用。



# R与VBA

```
Public Sub StartRServer(Optional WarningMsgs As Boolean = False)
```

```
Public Sub StopRServer(Optional suppressWarnings As Boolean = False)
```

```
Public Sub RRun(pString As String, Optional RcmdrExcelMenuUpdate As Boolean = False)
```

```
Public Sub PutArray(ArrName As String, ByVal SheetRange As Range, Optional WithRowNames As Boolean = False, Optional WithColNames As Boolean = False)
```

```
Public Sub GetArray(RExpression As String, SheetRange As Range, Optional CheckForEmpty As Boolean = False, Optional SaveUndo As Boolean = False, Optional SizeWarning As Boolean = False, Optional WithRowNames As Boolean = False, Optional WithColNames As Boolean = False)
```

```
Public Sub RunRFile(RFileName As String)
```

```
Sub ExcelGetFocus()
```

```
Public Sub PutDataframe(DFName As String, SheetRangeOrName As Variant, Optional WithRowNames As Boolean = False Optional RespectHidden As Boolean = True, Optional CheckDataframeName As Boolean = True, Optional UseRawDataTransfer As Boolean = False)
```

```
Public Sub GetDataframe(DFName As String, SheetRange As Range, Optional WithRowNames As Boolean = False, Optional CheckForEmpty As Boolean = False, Optional SaveUndo As Boolean = False, Optional SizeWarning As Boolean = False)
```

```
Sub RunRCodeFromRange(commandRange As Range)
```

```
Sub InsertCurrentRPlot(Location As Range, Optional picName As String, Optional widthRescale As Double = -1, Optional heightRescale As Double = -1, Optional closerGraph As Boolean = False)
```

```
Sub GetRApply(RFunction As String, trgtrange As Range, ParamArray args() As Variant)
```

```
Sub RunRCall(RProc As String, ParamArray args() As Variant)
```

# VBA DEMO

Option Explicit

Sub Demo ()

Worksheets(1).Activate

Rinterface.StartRServer

Rinterface.RRun "e<-rnorm(100) "

Rinterface.RRun "x<-c(1:100) "

Rinterface.RRun "y = 3\*x+e"

Rinterface.GetArray "x", Range("A2")

Rinterface.GetArray "e", Range("B2")

Rinterface.GetArray "y", Range("C2")

Rinterface.GetRApply "function() coef(lm(y~x)) ",  
Range("F2")

Rinterface.RunRCall  
"function(x,y)plot(x,y,type=""o"") ",  
Range("A2:A101"), Range("C2:C101")

Rinterface.InsertCurrentRPlot Range("E5"),  
widthrescale:=0.5, heightrescale:=0.5,  
closergraph:=True

'Rinterface.StopRServer

End Sub

谢谢