



Programming with the NAG library and extending GenStat

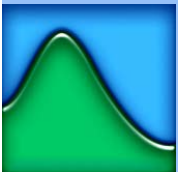
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Wageningen, 18th June 2008

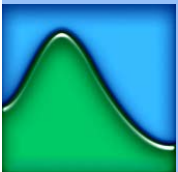
NAG library

- Collection of numerical and statistical algorithms
 - Supplied by Numerical Algorithms Group (NAG)
 - Available in Fortran and C
 - Website: www.nag.co.uk
- Routines include
 - Ordinary differential equations
 - Numerical integration and differentiation
 - Linear programming
 - Many standard statistical analysis



Using NAG routines in GenStat

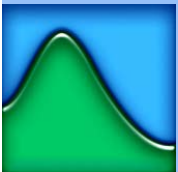
- Embedded Fortran library
- Complements facilities in GenStat
- NAG directive
- Available routines
 - NAG [PRINT=algorithms]
- Examples available via help menu
 - Help | Examples | Commands
- NAG algorithm documentation
 - Download from www.vsni.co.uk



NAG directive

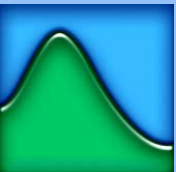
- Option NAME
 - Name of routine in full, i.e. D02KDF
 - Note NAG routine names not distinct to first 4 characters
- Parameter ARGUMENTS
 - Arguments for call in a pointer
 - Elements in same order as for NAG routine
 - Input arguments must be defined, output arguments do not
 - Pointer to expressions can be used for NAG arguments that expect subroutines or functions
- Parameter RESULT
 - Stores the return value of the NAG algorithm if it is a function

NAG [NAME=C02AGF] !p(A,N,SCALE,Z,W,IFAIL)



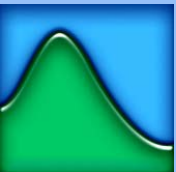
Procedure libraries

- Procedures
 - need to submit each time you start GenStat or start a new job
 - may want to supply many procedures
 - can easily be changed by other users
- Procedure library
 - a collection of GenStat procedures
 - a backing-store file used to store procedures
 - convenient way to access procedures system wide or locally
 - open automatically
- Create using Build Procedure Library Menu



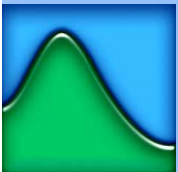
Attach Procedure libraries

- Maximum of 10 libraries allowed
- Must be labelled with an extension .glb or .gpl
- Copy file into the system or user add-in folder
 - System add-in folder
 - located in main installation e.g. \Gen10ed\AddIns
 - available to users who can access GenStat
 - User add-in folder
 - access to current user only
 - location set via options
 - \Documents and Settings\\My Documents\GenStatAddIns



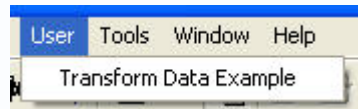
Attach Procedure libraries

- automatically attached at start-up
- can attach/detach during session using Attach Procedure Library menu
- help
 - Supply compiled html help file (.chm)
 - Available on Help menu in GenStat
 - F1 key can include help for procedures

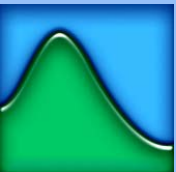


Custom dialogs

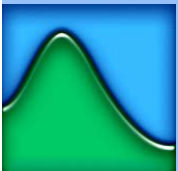
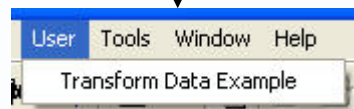
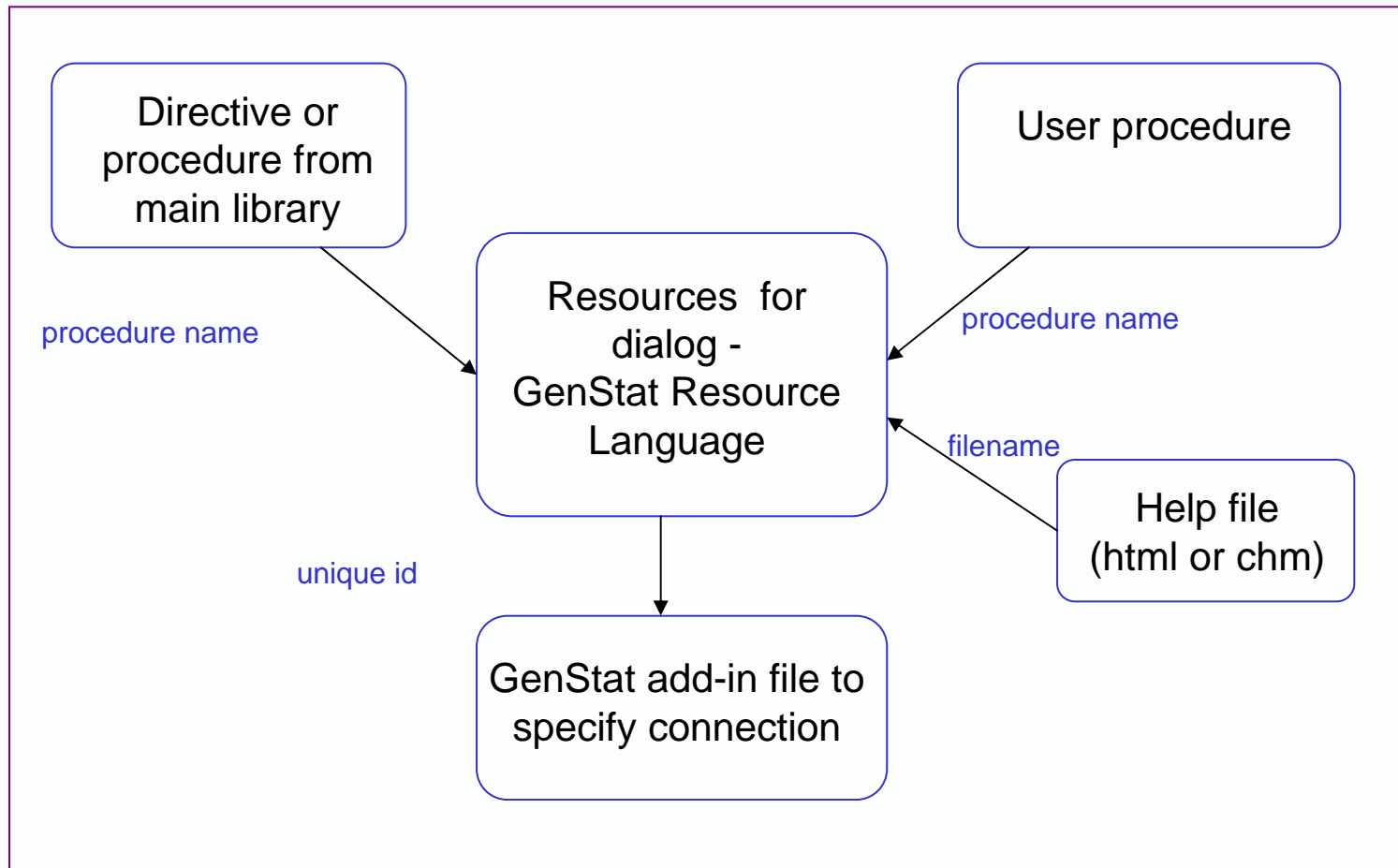
- Allows user dialogs to be run from the menu bar
 - Loaded at run-time
 - More features than procedure menus
 - Tools for designing dialogs accessible to all users
 - Opened from User menu bar



- Dialogs are combined with procedures
 - Use any directive or procedure from main library
 - Create you own procedures



Custom dialogs



GenStat resource language

- Commands for specifying layout and contents of a custom dialog
- The basic structure of the language
 - Specifies a unique id for dialog and the dimensions
 - Creates a title for the dialog
 - Includes the name of procedure to be activated when run
 - Specify controls (e.g. push buttons)

DIALOG id, width, height

CAPTION text

PROCEDURE text

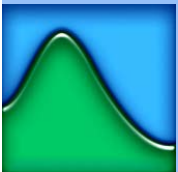
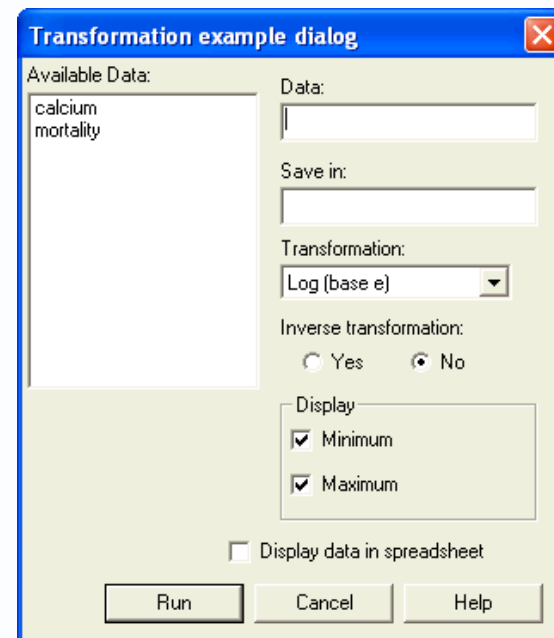
BEGIN

...

... Controls ...

...

END



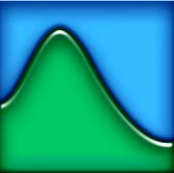
Dialog controls

- Objects user interacts with
 - Custom menu supports 9 types
- Used to make link between dialog and procedure
 - Linked by id matching procedure option/parameter names
 - Results from control passed to procedure

Example: BOXPLOT has an option called METHOD that has settings for schematic and box and whisker

```
RADIOBUTTON "Box and Whisker", METHOD, 10, 10, 90, 14, GW_OPT, "box"
```

```
RADIOBUTTON "Schematic", METHOD, 10, 30, 90, 14, GW_OPT | GW_SEL, "sche"
```

- 
- Box and Whisker
 - Schematic

Dialog controls

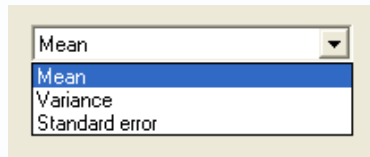
- Flags are used to specify style of control

Example: DESCRIBE has option called SELECTION and want to offer a choice of three of the settings

COMBOBOX SELECTION, 10, 10, 120, 90, GW_OPT | CB_DROPLIST

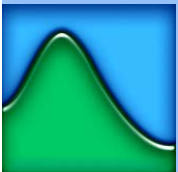
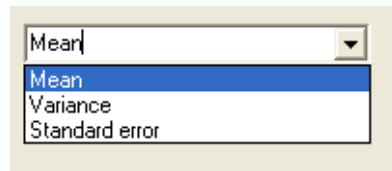
SLIST SELECTION, "Mean", "Variance", "Standard error"

RLIST SELECTION, "mean", "var", "se"



COMBOBOX SELECTION, 10, 10, 120, 90, GW_OPT | CB_DROPDOWN

SLIST SELECTION, "Mean", "Variance", "Standard error"



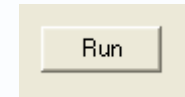
Dialog controls

- Task orientated controls are available

- These do not link to options/parameters, but have specific action

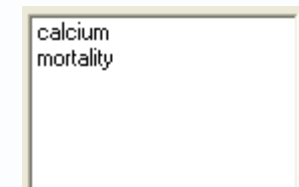
- Run button to run procedure and close dialog

```
PUSHBUTTON "Run", IDRUN, 10, 10, 40, 14, BS_RUN
```



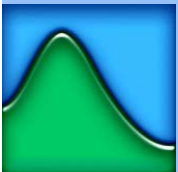
- Available data list to show current available data (allows single or multiple selection)

```
LISTBOX IDLIST, 2,12,90,120, GW_AVAILABLE
```



- Help button to open help either in html or compiled html (chm) format

```
PUSHBUTTON "Help", IDHELP, 10, 10, 40, 14, BS_HELP, "dialoghelp.html"
```

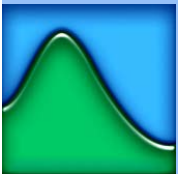


Edit controls

- Edit controls used in two ways
 - Receive text string
 - Receive identifier name
- Use with available data list
 - If single selection, name is copied to edit control
 - If multiple selection, names copied as comma separated list and names passed to procedure as a pointer
 - Use flag to specify data types displayed in available data list

Example: DESCRIBE has parameter DATA that only accepts variates

```
EDITTEXT DATA, 10,10, 90, 14, GW_PARAM|GW_AVAILABLE|DT_TYPVAR|EC_SET
```

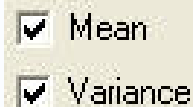


Check boxes

- Check box
 - Used for a list of responses

Example: SELECTION option for DESCRIBE

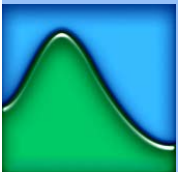
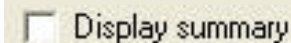
```
CHECKBOX "&Mean",SELECTION,104,60,90,14,GW_OPT | GW_SEL,"mean"  
CHECKBOX "&Variance",SELECTION,104,74,90,14,GW_OPT | GW_SEL,"var"
```



- Toggle box
 - True or false response

Example: PRINT option for DESCRIBE

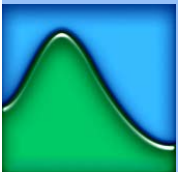
```
TOGGLEBOX "Display summary",PRINT,104,94,130,14,GW_OPT,"summary", "*"
```



Attaching to GenStat

- Resources
 - The resources should be saved in a text file with extension .grc
 - Resource file should be copied to AddIns folder
- Procedure
 - If using user procedure this should be stored in a procedure library
 - The procedure library should be copied to AddIns folder
- Add-in file
 - A GenStat Add-in (gad) file should be supplied in AddIns folder detailing connection

```
[AddIn1]
Type=DIALOG
ProgID=DIALOG_TRANSFORM
MenuTitle=Transform Data Example
ResourceFile=transform.grc
```



Example - Describe

- Summary statistics using DESCRIBE
 - Options **SELECTION** & **PRINT**
 - Parameter **DATA**

```
DIALOG DIALOG1,210, 170
CAPTION "Describe data"
PROCEDURE "DESCRIBE"
BEGIN
  PUSHBUTTON "&Run",IDRUN,90, 148, 54, 14,BS_RUN
  PUSHBUTTON "Cancel",IDCANCEL,148,148,54,14,BS_CANCEL
  LTEXT "&Available Data:",ITEXT,2,2,52,9
  LISTBOX IDLIST,2,12,90,120,GW_AVAILABLE
  LTEXT "&Data:",ISTATIC,100,20,46,9
  EDITTEXT DATA,100,30,100,14,GW_AVAILABLE | DT_TYPVAR | GW_PARAM |
  EC_SET
  GROUPBOX "Options", IDSTATIC, 100, 50, 100, 40
  CHECKBOX "&Mean",SELECTION,104,60,90,14,GW_OPT | GW_SEL,"mean"
  CHECKBOX "&Variance",SELECTION,104,74,90,14,GW_OPT | GW_SEL,"var"
  TOGGLEBOX "Display summary",PRINT,104,94,130,14,GW_OPT,"summ","*"
END
```

