A Maths Toolkit for Actuaries
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Agenda

- A quick recap [5 mins]
- An example [10 mins]
- Next steps [45 mins]

The essence of knowledge is, having it, to use it.

Sharpening the saw
An example

\[ C = e^{a + b} \]
\[ a_i = 0 \]
\[ b_i = 0 \]

Create data:

```
small pieces that are loosely coupled
```

Change directory:

```
setwd("C:/0_WORK/Work/R_training")
```

Import data:

```
xyData <- read.table("Triangle_10by10.csv", 
header = TRUE, sep = ",")
```

Perform modelling:

```
modVals <- glm(Y ~ a2 + a3 + a10 + b2 + b3 + b10, data = xyData, 
family = quasi(link = "log", variance = "mu"))
```

Look at results:

```
summary(modVals)
```

Create some plots:

```
plot(residuals(modVals))
```
Next Steps – maths topics

- Copulas
- Recursions
- Statis, GAMs, GLMs, Kernel Smoothing, Cubic Splines
- Extreme values
- Time series (seasonality, trends)
- Risk Measures
- Linear analysis – spectral theory
- Catastrophe theory, chaos theory, complex analysis
- Linear algebra
- Dynamical systems
- Numerical methods (integration, ODEs (Runge Kutta etc), PDEs)
- Fluid dynamics
- Fuzzy logic
- Bayesian methods
- Networks

Next Steps

- Re-form working party?
- How does Quantitative finance network fit in?
- Software comparison group?
- R fan club?
- IT methods group? IT philosophy group?
- Should we use a wiki?
- Should we blog?
- Newly qualified idea (create a wiki, pick a topic (with replacement), put in newly qualified packs, academic to help with reading list, link to universities (i.e. open wiki) collaboration, creating a network - put output on wiki)

Next Steps – surveys

- Look at syllabi of:
  - Physics
  - Psychology
  - Chemistry
  - Marketing
  - Maths
  - Engineers
  - Economics
  - Geographers
  - Biologists

We need links to some key papers
Next Steps – structure

Umbrella
Provide IT solution
Many pieces, loosely coupled
Free format
Do what interests you
Multi chair-people!
Agree delivery points throughout year
Present to GIRO as “maths toolkit”? or “this is a maths toolkit production”
Rename?
Too grand? Make smaller?