# **INSPIRING**SCIENCE INAUGURAL LECTURES

```
# Now do the main calculation.
# Now do a loop over initial guess
#figure(1)
#hold(False)
for j in range(0,6):
  thguess[1] = 100 + 100*j
  thguess[0] = 10
  ax2 = thguess[1]
  ax1 = thguess[0]
  # Now a loop over emitting temperature
  for i in range(0,NR):
    te=230+i*100./NR
    # print 'tguess', tguess
    qq = (A, B, Gamma, ha, te)
    th = fsolve(tsurf2,thguess,args=qq)
    # Now check the solution
    ttrop = th[1] - th[0]*Gamma
    techeck = ttrop*2**0.25
    print 'te, techeck, tguess', te, techec
        out
    # now collect in arrays
    TG[i] = th[1]
    TE[i] = te
    if abs(te-techeck) > .01:   # This if loop
         TG[i] = NaN
         TE[i] = NaN
    #
print j
figure(1)
plot(TE,TG)
xlabel('Emitting Temperature')
ylabel('Ground Temperature')
# ylim((220,1200))
```

# Science and Simulation: Whatever happened to Conjecture and Refutation?

## Professor Geoffrey Vallis

**Professor of Mathematics**

## Wednesday 3 December 2014, 5.15pm
## Harrison Lecture Theatre 004

Refreshments will be served after the presentation

In the good old days the scientific method was simple. A hypothesis was put forward, refined into a theory, and tested with an experiment (or so it goes). If the theory was consistent with the experiment all well and good, but if not the theory was discarded or at least modified, and so back to the drawing board. But these days we try to understand complex systems with complicated models, and if the model doesn't agree with observation we don't discard it, we tweak it!

Is this really the same thing? Should we and can we have a theory of a complex system – is that what a model is? Just what is the relationship of models, theories and understanding?

I'll discuss (but won't really answer) these questions from the perspective of a practicing scientist and in the context of practical problems in the climate sciences, where a complex nature and complicated models come together as never before.

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