Copula Processes

Speaker:
Andrew Gordon Wilson

University of Cambridge
http://mlg.eng.cam.ac.uk/andrew/

Joint work with
Zoubin Ghahramani

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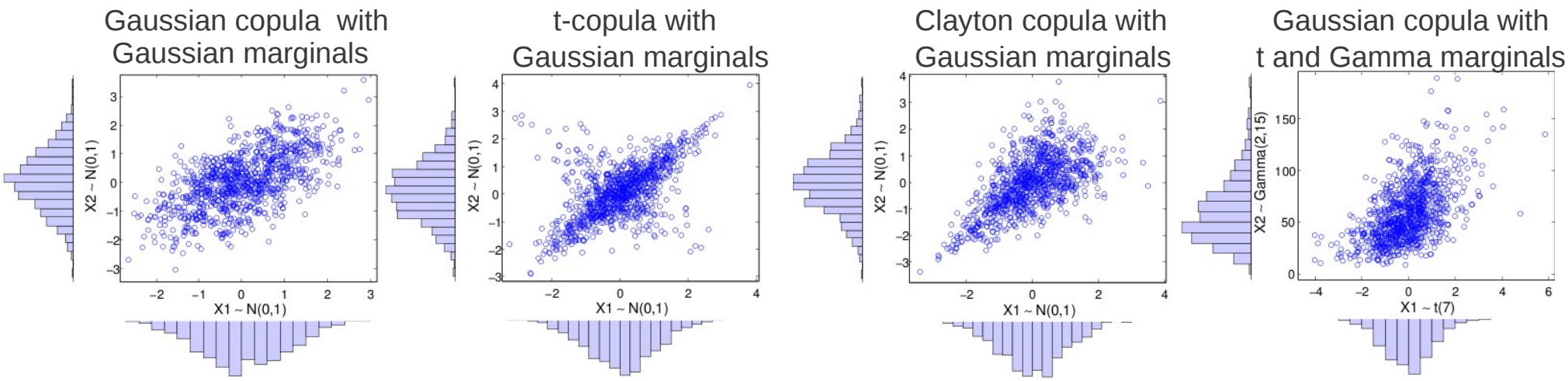
Copulas



A copula describes the dependencies between random variables independently of their marginals.

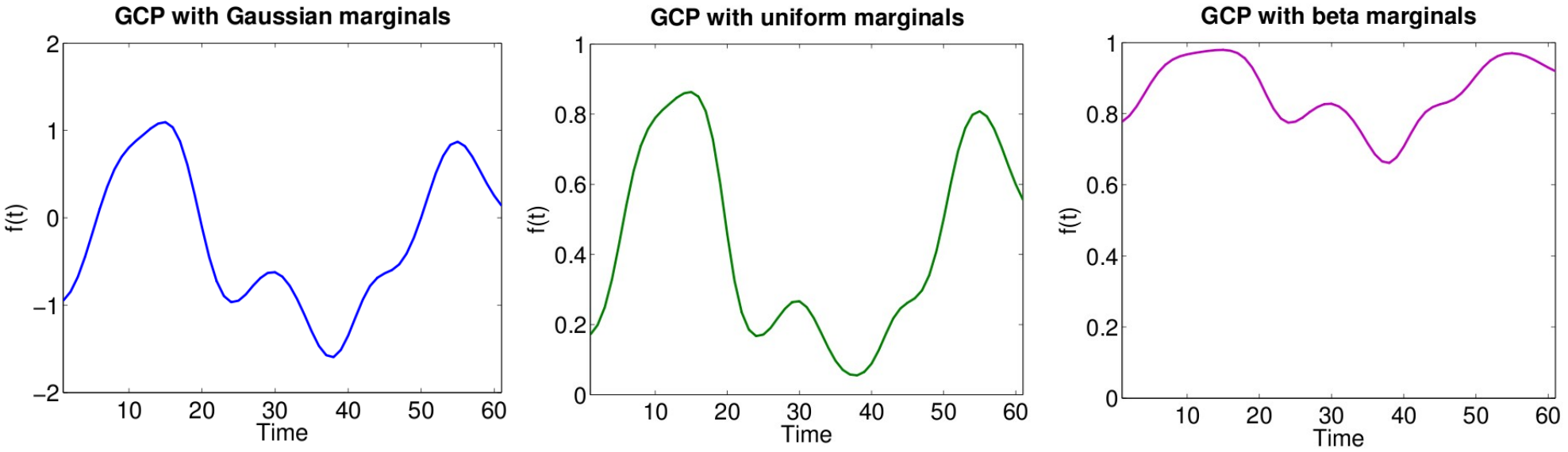
The bivariate Gaussian copula has the form:

$$C(u, v) = \Phi_\rho(\Phi^{-1}(u), \Phi^{-1}(v))$$

It was popularised in finance in 2000, and is now called "the formula that killed Wall street!"

We extend the copula framework to infinite dimensions...

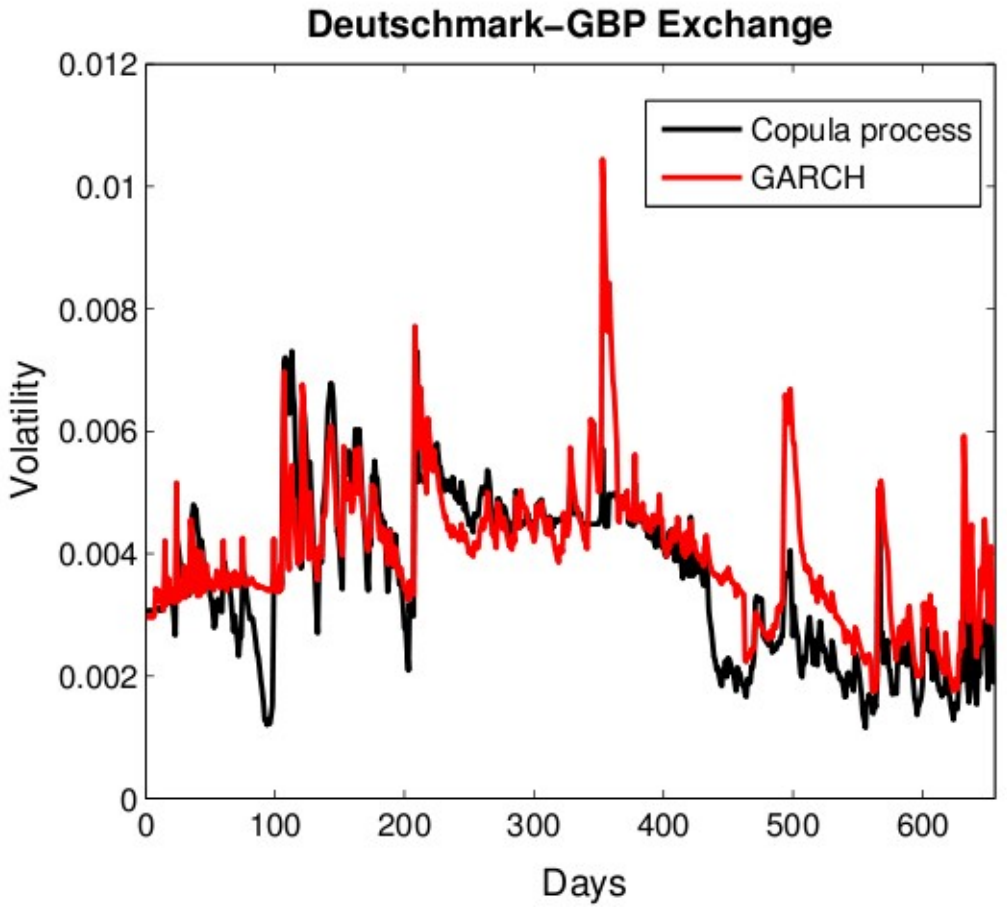
Copula Processes



These are sample functions drawn from a Gaussian copula process (GCP). The function values have an underlying Gaussian dependency structure, but Gaussian, uniform, and beta marginals, respectively.

A copula process describes the dependencies between arbitrarily many random variables independently of their marginal distributions.

Copula Processes for Volatility



We use a copula process to model the time changing standard deviation (volatility) of a sequence of random variables.

These are daily forecasts made by a Gaussian process based Gaussian copula process on a famous currency exchange data set, compared to GARCH forecasts.

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