Portfolio Optimisation

[Nematrian website page: PortfolioOptimisation, © Nematrian 2015]

The Nematrian pages on return forecasting explore some of the ways in which we can assess the possible future return characteristics of different investment ideas. However, it is not enough merely to be able to identify promising ideas. One must also construct suitable portfolios that encapsulate these ideas in a suitably risk controlled framework, perhaps using tools such as set out in the Nematrian pages on risk measurement.

This activity, if carried out in a quantitative manner, is typically referred to as *portfolio optimisation*. There is a rich body of mathematics that focuses on optimisation. In pages linked to this one we explore some of this material and how it can be applied to asset management and asset-liability management. We also explore other ways of approaching the portfolio construction problem (e.g. reverse optimisation that potentially circumvent some of the challenges that otherwise arise with purely quantitative optimisation techniques).

The main portfolio optimisation techniques currently summarised on the Nematrian website are:

(a) Mean-variance, i.e. constrained quadratic, optimisation;

(b) Resampled optimisation;

(c) Ideas on how these may be refined to make them better suited at handling extreme events, including use of Independent Components Analysis, see also Malcolm Kemp's book on Extreme Events: Robust Portfolio Construction in the Presence of Fat Tails.

The Nematrian website also provides tools for carrying out reverse optimisation, i.e. derivation of implied alphas.