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Optimal investment in high dimensions (with Pawel Zaczkowski)

Suppose you want to invest in a relatively large number of continuous assets whose volatilities and growth rates are functions of an independent high-dimensional diffusion, with the objective of (say) maximizing expected utility of wealth at some fixed time horizon. Conventionally we would try to find the value function, but the size of the statespace makes the calculation and storage of the value function impossible - so what can we do? Without claiming to be able to find an optimal solution, we propose methods that would allow us to evaluate candidate policies. The approach is simulation-based, which means that increasing dimension makes little difference to the computational effort required.