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# Quantile optimization under derivative constraint

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This talk will focus on a new type of quantile optimization problems arising from insurance contract design models. This type of optimization problems is characterized by a constraint that the derivatives of the decision quantile functions are bounded. Such a constraint essentially comes from the “incentive compatibility” constraint for any optimal insurance contract to avoid the potential severe problem of moral hazard in insurance contract design models. By a further development of the relaxation method, we provide a systemic approach to solving this new type of quantile optimization problems. The optimal quantile is expressed via the solution of a free boundary problem for a second-order nonlinear ordinary differential equation (ODE), which is similar to the Black-Scholes ODE for perpetual American options.

## Summary

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