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Optimal dividend and capital injection strategies : a viscosity approach

We consider the problem of finding the optimal dividend and capital injection strategies for a firm for which the cash (surplus) process is driven by Brownian motion. Dividend processes are assumed to be absolutely continuous whereas capital injections are only assumed to be adapted and non decreasing. We show that when it is only optimal to inject capital, we only do so to avoid bankruptcy. Using the theory of viscosity solutions and dynamic programming, we show that the value function is the unique viscosity solution of an associated HJB variational inequality. We characterize the optimal dividend strategy in terms of a threshold solution. We prove a comparison theorem for viscosity solutions which is used to show that the optimal solution to the problem is dichotomic : either we inject capital to avoid bankruptcy in the minimal way, or we never inject and let the firm default when the cash process hits zero.

This talk is based on joint work with and builds on previous talks by Jean-François Renaud and Clarence Simard.