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Optimal Dividend Payout Model with Risk Sensitive Preferences

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Abstract. We consider a discrete-time dividend payout problem with risk sensitive shareholders. It is assumed that they are equipped with a risk aversion coefficient and construct their discounted payoff with the help of the exponential premium principle. This leads to a risk adjusted discounted cash flow of dividends. Within such a framework not only the expected value of the dividends is taken into account but also their variability. Our approach is motivated by a remark in Gerber and Shiu (2004). We deal with the finite and infinite time horizon problems and prove that, even in this general setting, the optimal dividend policy is a band policy. We also show that the policy improvement algorithm can be used to obtain the optimal policy and the corresponding value function. Next, an explicit example is provided, in which the optimal policy is shown to be of a barrier type. Finally, we present some numerical studies and discuss the influence of the risk sensitive parameter on the optimal dividend policy.

Keywords. Dividend payout problem; Risk sensitive preferences; Bellman equation; Band policy; Policy improvement algorithm.

1. Introduction

The dividend payout model in risk theory is a classical problem that was introduced by de Finetti (1957). Since then there have been various extensions. The goal is to find for the free surplus process of an insurance company, a dividend payout strategy that maximises the expected discounted dividends until ruin. Typical models for the surplus process are compound Poisson processes, diffusion processes, general renewal processes or discrete time processes. The reader is referred to Albrecher and Thonhauser (2009) and Avanzi (2009), where excellent overviews of recent results are provided.

Up to now most of the research has been done for the risk neutral perspective, where the expected discounted dividends until ruin are considered. Obviously this criterion does not take the variability of the dividends into account. From the shareholders' perspective or from an economic point of view it would be certainly desirable to reduce the variability of the dividends. Risk should be incorporated in any kind of economic decision and shareholders are in general risk averse. In Gerber and Shiu (2004) the authors propose the problem of maximising the expected *utility* of discounted dividends until ruin instead. Such a criterion is able to model risk aversion. In Grandits et al. (2007) the authors

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