Shepp, Larry; **Shiryaev, A. N.**
The Russian option: Reduced regret. (English) Zbl 0783.90011
Ann. Appl. Probab. 3, No. 3, 631-640 (1993).

Summary: We propose a new put option where the option buyer receives the maximum price (discounted) that the option has ever traded at during the time period (which may be indefinitely long) between the purchase time and the exercise time, so that the buyer need look at the fluctuations only occasionally and enjoys having little or no regret that he did not exercise the option at an earlier time (except for the discounting). We give an exact simple formula for the optimal expected present value (fair price) that can be derived from the option and the (unique) optimal exercise strategy that achieves the optimum value under the assumption that the asset fluctuations follow the Black-Scholes exponential Brownian motion model, which is widely accepted. It is important to note that discounting is necessary: If it is omitted or even if it is less than the Black-Scholes drift, then the value to the buyer under optimum performance is infinite. We also solve the same problem under a different model: the original Bachelier linear Brownian market with linear discounting. This model is no longer accepted, but of course the mathematics is consistent.

To our knowledge no such regretless option is currently traded in any existing market despite its evident appeal. We call it the Russian option, partly to distinguish it from the American and European options, where the term of the option is prescribed in advance and where no exact formula for the value has been given.

MSC:

91B28	Finance etc. (MSC2000)
60H30	Applications of stochastic analysis (to PDEs, etc.)
60G44	Martingales with continuous parameter

Keywords:

Russian option; geometric Brownian motion model; put option

Full Text: DOI