EUROPEAN-TYPE OPTIONS IN THE DIFFUSION MODEL
(B,S)-FINANCIAL MARKET ON THE BASIS OF EXTREME
VALUE OF BASIC ASSET PRICE

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The investor builds up the investment portfolio with capital
$$X_t = \beta_t B_t + \gamma_t S_t, \quad t \in [0,T],$$
where $B_t$ is the price of riskfree asset, $S_t$ is the basic (risk) asset price, $\beta_t$ and $\gamma_t$ are shares
(quantities) of corresponding assets in the capital,

$$S_t = S_0 \exp\left[\left(\mu - \frac{\sigma^2}{2}\right)t + \sigma W_t\right],$$
where $B_0 > 0$, $S_0 > 0$, $r > 0$, $\sigma > 0$, i.e. a diffusion model
of $(B,S)$ - financial market [1] is under consideration. In the case of standard call and put
options payment obligations (functions) are given by [1]

$$f_T^c(S_t) = \max\left\{\left[S_t - K\right], 0\right\}, \quad f_T^p(S_t) = \max\left\{\left[K - S_t\right], 0\right\},$$
where $K$ is the striking price of option. The subject of this work is research of call and put
options, which belong to exotic options class [2] and are based on the extreme value of basic
asset price, the payoff functions of which are given by

$$f_T^{c\max} = \max\left\{\max_{0 \leq t \leq T} S_t - K, 0\right\}, \quad f_T^{c\min} = \max\left\{\min_{0 \leq t \leq T} S_t - K, 0\right\},$$

$$f_T^{p\min} = \max\left\{K - \min_{0 \leq t \leq T} S_t, 0\right\}, \quad f_T^{p\max} = \max\left\{K - \max_{0 \leq t \leq T} S_t, 0\right\}.\quad (1)\quad (2)\quad (3)$$

In this work there has been found formulas which determine the value of options,
corresponding to payment obligations (2), (3), as well as formulas which determine time
evolution of portfolios $\pi^*_t = (\beta^*_t, \gamma^*_t)$ and capitals $X^*_t$, which ensure the fulfillment of the
payment obligation.

References
   P. (in Russian)