Barrier Options

An *up-and-out* call is one that is worthless if $S$ ever exceeds some barrier $S_b$. The solution to this problem may be calculated using Black-Scholes, but it is beyond the scope of this course.

A graph of the option value is shown below. Note that the graphs hold only for $t < t_b$, where $S(t_b) = S_b$. (After that, the option is always worthless.)

Payoff of up-and-out call vs. $S$ for $\sigma = 0.2$, $T = 1$, $r = 0.05$, $K = 3$, $S_b = 6$.

In increasing order of thickness: $\tau = 0$, $1/3$, $2/3$, $1$. 