

Source | Option Family

doublim

1 The DoubleLimit Family

Premia 14

For this family, the payoff is given by:

- For an Out option:

$\varphi(S_T)$ if S doesn't reach the upper boundary $U(t)$ or the lower boundary $L(t)$ between the pricing date t_0 and the maturity T .

$R(t)$, which is paid at the time t when the upper or lower barrier is reached. The rebate $R(t)$ is the same for the two barriers.

The payoff H_T in monetary unit of time of the maturity T may be written:

$$H_T = \varphi(S_T) \mathbf{1}(\tau^* > T) + e^{r(T-\tau^*)} R(\tau^*) \mathbf{1}(\tau^* \leq T)$$

under the assumption the instantaneous interest rate r is constant, where

$$\tau^* = \inf \{u > t_0, S_u > U(u) \text{ or } S_u < L(u)\}$$

It is assumed that $L(t_0) < S_{t_0} < U(t_0)$.

- For an In option:

The payoff H_T in monetary unit of time of the maturity T may be written:

$$H_T = \varphi(S_T) \mathbf{1}(\tau^* \leq T) + R(T) \mathbf{1}(\tau^* > T)$$

2 Code Implementation

```
#ifndef _DOUBLIM_H
#define _DOUBLIM_H

#include "optype.h"
#include "var.h"

#include "chk.h"
#include "numfunc.h"

#define TYPEOPT DOUBLIM

/*Limit Option// General double barrier*/

typedef struct TYPEOPT{
    /* var_setable */
    VAR    PayOff;
    VAR    Rebate;
    VAR    LowerLimit;
    VAR    UpperLimit;
    VAR    Maturity;
    /* var_fixed */
    VAR    OutOrIn;
    VAR    Parisian;
    VAR    RebOrNo;
    VAR    EuOrAm;

} TYPEOPT;

int OPT(Get)(int user,Planning *pt_plan,Option *opt, Model *mod);
int OPT(FGet)(char **InputFile,int user,Planning *pt_plan,Option *opt, Model *mo
int OPT(Show)(int user,Planning *pt_plan,Option *opt, Model *mod);
int OPT(Check)(int user,Planning *pt_plan,Option *opt);

#endif
```