

## Help

```

#ifndef _OPTYPE_H
#define _OPTYPE_H

#include <stdio.h>
#include <stdlib.h>
#include <math.h>
#include <string.h>
#include <stdarg.h>
#include <time.h>
#include <ctype.h>

#include "pnl/pnl_matrix.h"
#include "pnl/pnl_vector.h"
#include "error_msg.h"

#ifdef _MSC_VER
#define MAXPATHLEN 256
#include "../configwin_specific.h"
#include <process.h> /*For calling Acrobat for help file*/
#else
#include <sys/param.h>
#define _spawnlp Spawnlp /* defined in var.c */
#define _P_WAIT 0
#endif

/*-----MACROS-----
-----*/

#define TOSTR(X) #X
#define TOSTR_2(X) TOSTR(X) /*if X is a macro, this forces
    evaluation*/
#define MERGE2_2(X,Y) MERGE2(X,Y)
#define MERGE2(X,Y) X##_##Y
#define MERGE3_2(X,Y,Z) MERGE3(X,Y,Z)
#define MERGE3(X,Y,Z) X##_##Y##_##Z
#define MERGE4_2(X,Y,Z,T) MERGE4(X,Y,Z,T)
#define MERGE4(X,Y,Z,T) X##_##Y##_##Z##_##T
#define MERGE5_2(X,Y,Z,T,U) MERGE5(X,Y,Z,T,U)

```

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#define MERGE5(X,Y,Z,T,U) X##_##Y##_##Z##_##T##_##U

/*-----CONST&TYPES-----
-----*/

#define MAX_PATH_LEN MAXPATHLEN
#define MAX_CHAR 180
#define MAX_CHAR_X3 (3 * MAX_CHAR)
#define MAX_CHAR_X4 (4 * MAX_CHAR)
#define MAX_MET 40 /*!< maximum number of methods */
#define MAX_OPT 30 /*!< maximum number of options */
#define MAX_PAR 15 /*!< maximum number of parameters for
    Pricing Methods */
#define MAX_PAR_DYNAMIC_TEST 30 /*!< maximum number of para
    meters for dynamic tests */
#define MAX_METHODS 40 /*!< = max number of Pricing
    methods */

typedef char          Label[MAX_CHAR];

#define NO_PAR -1
#define DONOTITERATE 16

#define TOSCREEN 0
#define TOFILE 1
#define TOSCREENANDFILE 2
#define NAMEONLYTOFILE 3
#define VALUEONLYTOFILE 4
#define TOVARARRAY 5
#define ZOOMTIME 1000

/* in pnl_mathtools.h
#define OK 0
#define WRONG 1
#define FAIL 1 */
#include "pnl/pnl_mathtools.h"
#define PREMIA_NONE -1
#define NONACTIVE -1 /* to identify non free objects */

```

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/*-----VAR-----
-----*/
typedef struct VAR_t VAR;

#define MAX_ITERATOR 3

typedef enum { SETABLE = 0, UNSETABLE = 1 } vsetable ;

typedef struct enumeration_t enumeration;
struct enumeration_t
{
    int          value;
    struct PremiaEnum_t *members;
};

struct VAR_t
{
    const char    *Vname;
    int Vtype;
    union
    {
        int V_INT;
        int V_INT2;
        int V_RGINT130;
        int V_RGINT13;
        int V_RGINT12;
        double V_DOUBLE;
        long V_LONG;
        double V_PDOUBLE;
        double V_SPDOUBLE;
        double V_SNDOUBLE;
        double V_SDOUBLE2;
        double V_RGDOUBLE051;
        double V_RGDOUBLE005;
        double V_DATE;
        double V_RGDOUBLE;
        double V_RGDOUBLE1;
        double V_RGDOUBLEM11;
        int V_PINT;
    }

```

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double V_RGDOUBLE12;
double V_RGDOUBLE02;
int V_BOOL;
int V_PADE;
double V_RGDOUBLE14;
char *V_FILENAME;
struct NumFunc_1 *V_NUMFUNC_1;
struct NumFunc_2 *V_NUMFUNC_2;
struct NumFunc_nd *V_NUMFUNC_ND;
struct PtVar *V_PTVAR;
PnlVect *V_PNLVECT;
PnlMat *V_PNLMAT;
PnlVectCompact *V_PNLVECTCOMPACT;
enumeration V_ENUM;
} Val;
int Viter;
vsetable Vsetable; /* a flag telling if a variable is to
                    * be set or get interactively */
void (*setter)(void *); /* if not null, points to a sett
                        er function accepting
                        * a pointer to a TypeModel or a
                        TypeOpt. Should be
                        * called immidiately after the
                        field has been
                        * changed */
};

/*
 * Vtype
 */
#define FIRSTLEVEL 29 /* first level types are stricly
                    * smaller than FIRSTLEVEL */

/*FirstClass*/
#define PREMIA_NULLTYPE 0
#define INT 1
#define DOUBLE 2
#define LONG 3
#define PDOUBLE 4
#define DATE 5
#define RGDOUBLE 6

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```
#define BOOL 7
#define PADE 8
#define RGDOUBLE12 9
#define INT2 10
#define RGINT13 11
#define RGINT12 12
#define SPDOUBLE 13
#define RGDOUBLE051 14
#define RGDOUBLE005 15
#define RGDOUBLE14 18
#define RGDOUBLEM11 19
#define PINT 20
#define RGDOUBLE1 21
#define RGDOUBLE02 22
#define FILENAME 24
#define ENUM 25
#define RGINT130 26
#define SDOUBLE 27
#define SDOUBLE2 28

/*SecondClass*/
#define NUMFUNC_1 29
#define NUMFUNC_2 30
#define NUMFUNC_ND 31
#define PTVAR 32
#define PNLVECT 33
#define PNLVECTCOMPACT 34
#define PNLMAT 35
/*This last type should be less than MAX_TYPE:*/

#define MAX_TYPE 40
/*Viter*/
#define IRRELEVANT -3
#define FORBID -2
#define ALLOW -1
#define ALREADYITERATED 256
/*MAX_ITERATOR should be less than ALREADYITERATED*/

/*Useful Flags*/

#undef IN
```

```

#undef OUT
#define EURO 0
#define AMER 1
#define TOTAL 0
#define PARTIAL 1
#define CONT 0
#define DISC 1
#define OUT 0
#define IN 1
#define DOWN 0
#define UP 1
#define REBATE 0
#define NOREBATE 1
#define CONSTLIM 0
#define MOVLIM 1
#define TIMEAVERAGING 10

/*-----PLANNING-----
-----*/

#define MAX_ITER 1000

typedef struct Iterator
{
    VAR    *Location;
    VAR    Min;
    VAR    Max;
    VAR    Default;
    int     StepNumber;
} Iterator;

typedef struct
{
    char     Action;
    int     NumberOfMethods;
    Iterator Par[MAX_ITERATOR];
    int     VarNumber;
} Planning;

/*SecondLevelVars*/
/*Arrays of VAR*/

```

```

typedef struct PtVar
{
    VAR Par[MAX_PAR];
} PtVar;

/*NumericalFunctions*/

typedef struct NumFunc_1
{
    double (*Compute)(VAR *, double);
    VAR Par[MAX_PAR];
    int (*Check)(int user, Planning *, void *);
} NumFunc_1;

typedef struct NumFunc_2
{
    double (*Compute)(VAR *, double, double);
    VAR Par[MAX_PAR];
    int (*Check)(int user, Planning *, void *);
} NumFunc_2;

typedef struct NumFunc_nd
{
    double (*Compute)(VAR *, PnlVect *);
    VAR Par[MAX_PAR];
    int (*Check)(int user, Planning *, void *);
} NumFunc_nd;

/*-----MODELS-----
   -----*/

typedef struct Model
{
    Label      ID;
    const char *Name;
    void      *TypeModel;
    int (*Get)(int user, Planning *, struct Model *);

```

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int (*FGet)(char **InputFile, int user, Planning *,
    struct Model *);
int (*Show)(int user, Planning *, struct Model *);
int (*Check)(int user, Planning *, struct Model *);
int (*Init)(struct Model *);
int      nvar; /* number of VARS in TypeModel */
int      init; /* zero before initialization */
/* if HelpFilenameHint == NULL PDF file with documentati
   on for the model can be found at doc/pdf_html/mod/%ID%/ID%
   _doc.pdf */
/* otherwise the path to the documentation is doc/pdf_ht
   ml/mod/%HelpFilenameHint%/HelpFilenameHint%_doc.pdf */
const char *HelpFilenameHint;
} Model;

#define MOD(X) MERGE2_2(TYPEMOD,X)
#define MAKEMOD(X)  MAKEMODEL(TOSTR_2(TYPEMOD), X)
#define MAKEMOD_FULL(X)  MAKEMODEL_FULL(TOSTR_2(TYPEMOD), X
    )
#define MAKEMODEL(Z,X) Model MOD(model)={Z ,#X,& X,Get_
    model_gen,FGet_model_gen, {
Show_model_gen,chk_model_gen,MOD(Init), 0, 0, 0}
#define MAKEMODEL_FULL(Z,X) Model MOD(model)={
    {Z ,#X,& X,MOD(Get),MOD(FGet), Show_model_gen,MOD(Check
    ),MOD(Init), 0, 0, 0}

/* -----OPTIONS-----
   -----*/

typedef struct Option
{
    Label      ID;
    const char  *Name;
    void        *TypeOpt;
    int (*Get)(int user, Planning *, struct Option *, Model *
    );
    int (*FGet)(char **InputFile, int user, Planning *,
        struct Option *, Model *);
    int (*Show)(int user, Planning *, struct Option *, Model
        *);
    int (*Check)(int user, Planning *, struct Option *);

```



```

int (*Init)(struct Option *, Model *);
int          nvar; /* number of VARS */
int          init; /* zero before initialization */
int          nvar_setable; /* number of VARS which ar
    e asked interactively */
/* if HelpFilenameHint == NULL PDF file with documentati
    on for the option can be found at doc/pdf_html/opt/%ID%/%Na
    me%_doc.pdf */
/* otherwise the path to the documentation is doc/pdf_ht
    ml/opt/%ID%/%HelpFilenameHint%_doc.pdf */
const char    *HelpFilenameHint;
} Option;

#define OPT(X) MERGE2_2(TYPEOPT,X)
#define MAKEOPT(X) MAKEOPTION(TOSTR_2(TYPEOPT), X)
#define MAKEOPT_FULL(X) MAKEOPTION_FULL(TOSTR_2(TYPEOPT),
    X)
/* #define MAKEOPTION(Z,X) Option OPT( X)={Z ,#X,& X,OPT(
    Get),OPT(FGet),OPT(Show),chk_option_gen,OPT(Init),0,0,0,0} *
    /
#define MAKEOPTION(Z,X) Option OPT( X)={Z ,#X,& X,Get_
    option_gen,FGet_option_gen,Show_option_gen,chk_option_gen,OPT(
    Init),0,0,0,0}
#define MAKEOPTION_FULL(Z,X) Option OPT( X)={Z ,#X,& X,OPT(
    Get),OPT(FGet),OPT(Show),OPT(Check),OPT(Init),0,0,0,0}

typedef Option *Family[MAX_OPT];

/*-----PRICINGS & DYNAMIC
    TESTS-----*/

/*Pricing Methods*/
typedef struct PricingMethod
{
    const char          *Name;
    VAR                Par[MAX_PAR];
    int (*Compute)(void *, void *, struct PricingMethod *);
    VAR                Res[MAX_PAR];
    int (*CheckOpt)(void *, void *);
    int (*Check)(int user, Planning *, void *);

```

```
int (*Init)(struct PricingMethod *, Option *);
int                                     init; /* zero before
      initialization */
/* if HelpFilenameHint == NULL PDF file with documentati
   on for the
   * pricing method can be found at
   * doc/pdf_html/mod/%Model%/%Model%/%Family%/%Name%_doc.
     pdf
   * otherwise the path to the documentation is
   * doc/pdf_html/mod/%Model%/%Model%/%Family%/%HelpFilena
     meHint%_doc.pdf
   * where Model is "corrected" model name for the pricing
     (see
   * Model::HelpFilenameHint)
   * Family is family name for the pricing
   */
const char                             *HelpFilenameHint;
} PricingMethod;

#define MET(X) MERGE3_2(TYPEMOD,TYPEOPT,X)
#define CALC(X) MERGE4_2(CALC,TYPEMOD,TYPEOPT,X)

/*Dynamic Tests*/

typedef struct    DynamicTest
{
    const char                                         *Name;
    VAR Par[MAX_PAR_DYNAMIC_TEST];
    int (*Simul)(void *, void *, PricingMethod *Met, struct    DynamicTest *);
    VAR Res[MAX_PAR_DYNAMIC_TEST];
    int (*CheckTest)(void *, void *, PricingMethod *Met);
    int (*Check)(int user, Planning *, void *);
    int (*Init)(struct DynamicTest *, Option *);
} DynamicTest ;

#define TEST(X) MERGE3_2(TYPEMOD,TYPEOPT,X)

typedef struct Pricing
{
    Label                      ID;
    PricingMethod              **Methods;
```

```

    DynamicTest **Test;
    int (*CheckMixing)(Option *, Model *);
} Pricing;

#define MOD_OPT(X) MERGE3_2(TYPEMOD,TYPEOPT,X)
#define CHK_OPT(X) MERGE4_2(CHK_OPT,TYPEMOD,TYPEOPT,X)
#define ID_MOD_OPT TOSTR_2(MERGE2_2(TYPEMOD,TYPEOPT))
#define CHK_TEST(X) MERGE5_2(CHK_TEST,TYPEMOD,TYPEOPT,MET,X
    )
/*Time Info*/

typedef struct TimeInfo
{
    Label                                Name;
    VAR Par[MAX_PAR];
    VAR Res[MAX_PAR];
    int (*Check)(int user, Planning *, struct TimeInfo *);
    int (*Init)(struct TimeInfo *);
} TimeInfo;

#endif

```

## References