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#include "stda.h"

static NumFunc_1 put =
{
    Put,
    {"Strike", PDOUBLE, {100}, ALLOW, SETABLE}, {" ", PREMIA
        _NULLTYPE, {0}, FORBID, SETABLE}},
    CHK_call
};

static TYPEOPT Gap =
{
    /*PayOff*/ {"Payoff", NUMFUNC_1, {0}, ALLOW, SETABLE
    },
    /*EuOrAm*/ {"Euro", BOOL, {AMER}, IRRELEVANT, UNSE
        TABLE},
    /*Maturity*/ {"Maturity", DATE, {0}, ALLOW, SETABLE},
    /*DeemedContribution*/ {"Deemed Contribution", PDOUBLE,
        {0}, IRRELEVANT, UNSETABLE},
    /*InitialAge*/ {"Initial Age", PDOUBLE, {0}, IRRELEVANT,
        UNSETABLE},
    /*Premium*/ {"Premium", PDOUBLE, {0}, IRRELEVANT, UNSETA
        BLE},
    /*MinimumGuarantee*/ {"MinimumGuaranteed", PDOUBLE, {0},
        IRRELEVANT, UNSETABLE},
    {"Number of Monitoring Dates", PINT, {0}, ALLOW, SETABLE}
    ,
    /*Alpha*/ {"Alpha", RGDOUBLE, {0}, ALLOW, SETABLE},
    /*Alpha_m*/ {"Alpha_m", PDOUBLE, {0}, IRRELEVANT, UNSETA
        BLE},
    /*MultiplierCPPi*/ {"MultiplierCPPi", PDOUBLE, {0}, IR
        RELEVANT, UNSETABLE},
    /*Ratchet*/ {"Ratchet", BOOL, {0}, IRRELEVANT, UNSETABLE},
    /*Gamma*/ {"Gamma", PDOUBLE, {0}, IRRELEVANT, UNSETABLE},
    /*Bonus B*/ {"Bonus", PDOUBLE, {0}, IRRELEVANT, UNSETABLE
        },
    /*WithdrawalRate G*/ {"WithdrawalRate", PDOUBLE, {0}, IR
        RELEVANT, UNSETABLE},
    /*Base case surrender charges*/ {"SurrenderCharges", PNLV
        ECT, {0}, IRRELEVANT, UNSETABLE},

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    /*Base case surrender Times*/{"SurrenderTimes", PNLVEC
    T, {0}, IRRELEVANT, UNSETABLE},
    /*Mortality*/{"MortalityData", FILENAME, {0}, IRRELEVANT,
    UNSETABLE},
    /*Maximum WithdrawlRate G*/ {"MaximumWithdrawlRate", PDO
    UBLE, {0}, FORBID, UNSETABLE},
    /*RateAccumulation*/ {"RateAccumulation", PDOUBLE, {0},
    FORBID, UNSETABLE},
    /*PremiumPercentage*/ {"PremiumPercentage", PDOUBLE, {0
    }, FORBID, UNSETABLE},
    /*RollUpRate*/ {"CompoundRollUpRate", PDOUBLE, {0}, FORB
    ID, UNSETABLE},
    /*ForceOfMortality*/ {"ForceOfMortality", PDOUBLE, {0},
    FORBID, UNSETABLE},
    /*TermCertainAnnuitiyMaturity*/ {"TermCertainAnnuitiyMatu
    rity", DATE, {0},FORBID,UNSETABLE},
};

static int OPT(Init)(Option *opt, Model *mod)
{
    TYPEOPT *pt = (TYPEOPT *) (opt->TypeOpt);

    if (opt->init == 0)
    {
        opt->init = 1;
        opt->nvar = 24;
        opt->nvar_setable = 4;

        pt->PayOff.Val.V_NUMFUNC_1 = &put;

        (pt->Maturity).Val.V_DATE = 1.0;
        (pt->PayOff.Val.V_NUMFUNC_1)->Par[0].Val.V_PDOUBLE =
        90.0;
        (pt->Alpha).Val.V_RGDOUBLE = 0.9;
        (pt->NumberOfMonitoringDates).Val.V_PINT = 252;
    }

    return OK;
}

MAKEOPT(Gap);

```

References