

{RAND4.PAS}

Type

MATRIZ1 = Array[0..2,0..2] of Double;

VETOR3 = Array[1..50,0..5] of Double;

VETOR6 = Array[0..5] of Double;

Const

M1: Double = 4294967087.0;

M2: Double = 4294944443.0;

NORM: Double = 1.0 / (4294967087.0 + 1.0);

A12: Double = 1403580.0;

A13N: Double = 810728.0;

A21: Double = 527612.0;

A23N: Double = 1370589.0;

TWO17: Double = 131072.0;

TWO53: Double = 9007199254740992.0;

A1P127: MATRIZ1 = (

( 2427906178.0, 3580155704.0, 949770784.0),

( 226153695.0, 1230515664.0, 3580155704.0),

( 1988835001.0, 986791581.0, 1230515664.0)

);

A2P127: MATRIZ1 = (

( 1464411153.0, 277697599.0, 1610723613.0 ),

( 32183930.0, 1464411153.0, 1022607788.0 ),

( 2824425944.0, 32183930.0, 2093834863.0 )

);

Var

CG, BG, IG: VETOR3;

Semente: VETOR6;

SERIE: Integer;

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Function MULTMODM (A, S, C, M: Double): Double;

Var

V: Double;

A1: Longint;

Begin

V := A \* S + C;

If ((V >= TWO53) or (V <= -TWO53)) then

Begin

A1 := trunc(A / TWO17);

A := A - (A1 \* TWO17);

V := A1 \* S;

A1 := trunc(V / M);

V := V - (A1 \* M);

V := V \* TWO17 + A \* S + C;

End;

A1 := trunc(V / M);

V := V - (A1 \* M);

If (V < 0.0) then MULTMODM := V + M else MULTMODM := V;

End;

{-----------------------------------------------------------------}

Procedure MATVECMODM (Var A: MATRIZ1; Var S: array of Double; Var V: Array of Double; M: Double);

Var

I: Integer;

X: Array[0..2] of Double;

ZERO: Double;

Begin

ZERO := 0.0;

For I := 0 to 2 do

Begin

X[I] := MULTMODM (A[I][0], S[0], ZERO, M);

X[I] := MULTMODM (A[I][1], S[1], X[I], M);

X[I] := MULTMODM (A[I][2], S[2], X[I], M);

End;

For I := 0 to 2 do

Begin

V[I] := X[I];

End;

End;

{---------------------------------------------------------------------}

Function RAND4 : Double;

Var

K: Longint;

P1, P2, U: Double;

Begin

{ Componente 1 }

P1 := A12 \* CG[SERIE][1] - A13N \* CG[SERIE][0];

K := trunc(P1/M1);

P1 := P1 - (K \* M1);

if (P1 < 0.0) then P1 := P1 + M1;

CG[SERIE][0] := CG[SERIE][1];

CG[SERIE][1] := CG[SERIE][2];

CG[SERIE][2] := P1;

{ Componente 2 }

P2 := A21 \* CG[SERIE][5] - A23N \* CG[SERIE][3];

K := trunc(P2/M2);

P2 := P2 - (K \* M2);

if (P2 < 0.0) then P2 := P2 + M2;

CG[SERIE][3] := CG[SERIE][4];

CG[SERIE][4] := CG[SERIE][5];

CG[SERIE][5] := P2;

{ Combinacao}

if (P1 > P2) then U := (P1 - P2) \* NORM

else U := (P1 - P2 + M1) \* NORM;

RAND4 := U;

End;

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Procedure PASSASEMENTE;

Var

I,J: Integer;

TEMP: array[0..2] of Double;

Begin

For I := 0 to 5 do

Begin

BG[1][I] := Semente[I];

CG[1][I] := Semente[I];

IG[1][I] := Semente[I];

End;

For J := 2 to 50 do

Begin

For I := 0 to 2 do

Begin

TEMP[I] := Semente[I];

End;

MATVECMODM (A1P127, TEMP, TEMP, M1);

For I := 0 to 2 do

Begin

Semente[I] := TEMP[I];

End;

For I := 0 to 2 do

Begin

TEMP[I] := Semente[I + 3];

End;

MATVECMODM (A2P127, TEMP, TEMP, M2);

For I := 0 to 2 do

Begin

Semente[I + 3] := TEMP[I];

End;

For I := 0 to 5 do

Begin

BG[J][I] := Semente[I];

CG[J][I] := Semente[I];

IG[J][I] := Semente[I];

End;

End;

End;

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