```
'--- Global constants
Global Const TRUE = -1
Global Const FALSE = 0
Global Const NOSTEP = -32768
'  - Warning!
'  - MAX_ELEMENTS      must be <= 16.000
'  - MAX_STEP*MAX_FILE must be <= 16.000
Global Const MAX_ELEMENTS = 10000
Global Const MAX_STEP = 50
Global Const MAX_FILE = 100
'  - format strings
Global Const F3_0$ = "000"
Global Const F6_4$ = "0.0000"

'--- Global variables
Global CANCEL As Integer
Global BOTHDIR As Integer
Global NLIST As Integer

Global ALPHA_DC_MIN As Single
Global ALPHA_DC_MAX As Single
Global OMEGA_C As Single
Global EPS  As Single

Global STEP_HEIGHT() As Single
Global FILES() As String
Global CRLF$
Global T$
```

```
Sub Form_Load ()
    Drive.Drive = "c:\"
    Directory.Path = "c:\fortran\programs\data"
    TextDirectory.Text = Directory.Path

    File.Path = Directory.Path
    File.Pattern = "*.out"
    TextFilename.Text = File.Pattern
End Sub

Sub Drive_Change ()
    Directory.Path = Drive.Drive
End Sub

Sub Directory_Change ()
    File.Path = Directory.Path
    TextDirectory.Text = Directory.Path
    CommandRemoveAll_Click
End Sub

Sub TextFilename_Change ()
    File.Pattern = TextFilename.Text
End Sub

Sub CommandCancel_Click ()
    Beep
    CANCEL = TRUE
    Loadfile.Hide
    StepAmpl.SetFocus
End Sub

Sub CommandAdd_Click ()
    Dim exists As Integer
    Dim i As Integer
    Dim ntemp As Integer

    ntemp = ListFiles.ListCount - 1

'-- check wheter file has already been inserted into list
    For i = 0 To ntemp
        If ListFiles.List(i) = File.Filename Then
            exists = TRUE
        End If
    Next i

'-- add file to list
    If exists <> TRUE And File.Filename <> "" Then
        ListFiles.AddItem File.Filename
    End If
End Sub

Sub File_DblClick ()
    CommandAdd_Click
End Sub

Sub CommandRemove_Click ()
    If ListFiles.ListIndex <> -1 Then
        ListFiles.RemoveItem ListFiles.ListIndex
    End If
End Sub

Sub ListFiles_DblClick ()
    CommandRemove_Click
End Sub

Sub CommandRemoveAll_Click ()
    Dim i As Integer
    Dim ntemp As Integer

    ntemp = ListFiles.ListCount - 1
    If ntemp <> -1 Then
        ListFiles.ListIndex = 0      'select first element of list
        For i = 0 To ntemp
            ListFiles.RemoveItem 0
```

```
        Next i
    End If
End Sub

Sub CommandOk_Click ()

    NLIST = ListFiles.ListCount - 1
    If NLIST = -1 Then Exit Sub
    If NLIST > 100 Then
        MsgBox "Too many files." + CRLF$ + "Allowed: " + Str$(MAX_FILE) + " files max.", 0 + 48
, "Error"
        Exit Sub
    End If

    ReDim FILES(NLIST) As String
    For i = 0 To NLIST
        FILES(i) = Directory.Path + "\" + ListFiles.List(i)
    Next i

    Loadfile.Hide
    CANCEL = FALSE
End Sub

Sub CommandAddAll_Click ()
    Dim nfile As Integer
    Dim ntemp As Integer
    Dim i As Integer
    Dim k As Integer

    nfile = File.ListCount - 1
    ntemp = ListFiles.ListCount - 1

    For k = 0 To nfile
        exists = FALSE
'------ check wheter file has already been inserted into list
        For i = 0 To ntemp
            If ListFiles.List(i) = File.List(k) Then
                exists = TRUE
            End If
        Next i
'------ add file to list
        If exists <> TRUE And File.List(k) <> "" Then
            ListFiles.AddItem File.List(k)
        End If
    Next k
End Sub

Sub CommandHelp_Click ()
    MsgBox "Da definire", 0 + 64, "Help"
End Sub
```

```
Sub MenuFileExit_Click ()
    End
End Sub

Sub MenuFileLoad_Click ()
    Loadfile.Show
End Sub

Sub Form_Load ()

    CRLF$ = Chr$(13) + Chr$(10)
    cancel = TRUE

    MenuFileSave.Enabled = FALSE
    LabelFile.Enabled = FALSE
    TextFile.Enabled = FALSE
    TextFile.Text = ""

    LabelResults.Enabled = FALSE
    TextResults.Enabled = FALSE
    TextResults.Text = ""

End Sub

Sub Form_GotFocus ()

    If cancel = TRUE Then
        MenuFileSave.Enabled = FALSE
        MenuComputeDo.Enabled = FALSE
    Else
        MenuComputeDo.Enabled = TRUE
    End If

    cancel = FALSE

End Sub

Sub MenuComputeDo_Click ()
    Dim k As Integer
    Dim nstep As Integer
    Dim n_tot As Integer
    Dim n_fold As Integer
    Dim filename As String

    ReDim eta_tmp(1 To MAX_ELEMENTS) As Single
    ReDim alpha_tmp(1 To MAX_ELEMENTS) As Single

    ReDim alpha(1 To MAX_ELEMENTS) As Single
    ReDim eta1(1 To MAX_ELEMENTS) As Single
    ReDim eta2(1 To MAX_ELEMENTS) As Single
    ReDim step_yn(1 To MAX_ELEMENTS, 1 To 2) As Integer

    ReDim STEP_HEIGHT(-MAX_STEP To MAX_STEP, 0 To MAX_FILE - 1) As Single

    StepAmpl.Cls
    LabelFile.Enabled = TRUE
    LabelResults.Enabled = TRUE
    TextResults.Enabled = TRUE
    T$ = ""

    For k = 0 To NLIST
        filename = FILES(k)
        Call StripFilename(filename)

        Call ReadFile(filename, n_tot, eta_tmp(), alpha_tmp())

'------ check error
        nstep = Int(Abs(ALPHA_DC_MAX - ALPHA_DC_MIN) / OMEGA_C + 1)
        If nstep > MAX_STEP Then
            MsgBox "Too many steps." + CRLF$ + "Allowed: " + Str$(MAX_STEP) + " steps max.", 0
+ 16, "Error"
            Exit Sub
        End If
```

```
        Call FoldAlpha(n_tot, eta_tmp(), alpha_tmp(), n_fold, alpha(), eta1(), eta2())
        Call FindStep(n_fold, alpha(), eta1(), eta2(), step_yn())

        Call StepHeight(n_fold, alpha(), eta1(), step_yn(), k, STEP_HEIGHT())
        T$ = T$ + CRLF$

        TextResults.Text = T$

    Next k

    MenuFileSave.Enabled = TRUE

End Sub

Sub MenuFileSave_Click ()
    SaveFile.Show
    SaveFile.SetFocus
End Sub

Sub MenuHelpAbout_Click ()
        MsgBox "Program StepAmpl" + CRLF$ + "version 1.0.5, 26 October 1994" + CRLF$ + CRLF$ +
"by S. Maggi, IEN-GF" + CRLF$ + CRLF$ + "uses: eps = 0.025 omega_c", 0 + 64, "About StepAmpl"
End Sub

Sub Form_Resize ()
    TextResults.Height = StepAmpl.Height - 1650
    TextResults.Width = StepAmpl.Width - 570
End Sub
```

```
Sub ReadFile (FILE$, ndata%, x_tmp(), y_tmp())
    Dim i As Integer
    Dim param As String
    Dim tmp As String
    Dim find As String

'-- check whether simulation was made by stepping alpha_dc in both directions
    find$ = "simulate"
    lenght = 1
    Call FindParam(FILE$, find$, lenght, param$)
    If param$ = "t" Then
        BOTHDIR = TRUE
    ElseIf param$ = "f" Then
        BOTHDIR = FALSE
    End If

'-- find alpha_dc_min and alpha_dc_max
    find$ = "normalized dc current range:"
    lenght = 25
    Call FindParam(FILE$, find$, lenght, param$)
    ALPHA_DC_MIN = Val(Left$(param$, 12))
    ALPHA_DC_MAX = Val(Right$(param$, 12))

'-- find Omega_c value
    find$ = "normalized rf frequency"
    lenght = 12
    Call FindParam(FILE$, find$, lenght, param$)
    OMEGA_C = Val(param$)
    eps = .025 * OMEGA_C

'-- read simulation results
    Open FILE$ For Input Lock Read Write As #1

'------ skip lines until start of useful data
        Do
            Line Input #1, tmp$
        Loop Until Left$(LTrim$(tmp$), 3) = "eta"

'------ skip one more line
        Line Input #1, tmp$

'------ read data
        i = 0
        Do Until EOF(1)
            i = i + 1
            Input #1, x_tmp(i), y_tmp(i)
        Loop
        ndata = i

    Close #1

End Sub

Sub FindParam (FILE$, find$, length, param$)
    Dim lfind As Integer
    Dim tmp As String
    Dim t_tmp As String

    Open FILE$ For Input Lock Read Write As #1

'-- skip lines until string find$ is found
    lfind = Len(find$)
    find$ = LCase$(find$)
    Do
        Line Input #1, tmp$
        t_tmp$ = LCase$(Left$(LTrim$(tmp$), lfind))
    Loop Until t_tmp$ = find$

'-- read parameter string, with lenght 'lenght'
    param$ = LCase$(Right$(RTrim$(tmp$), length))
    Close #1
End Sub

Sub FoldAlpha (n_max%, eta_tmp(), alpha_tmp(), n_fold%, alpha(), eta1(), eta2())
```

```
    Dim i1 As Integer
    Dim i2 As Integer

    If BOTHDIR = FALSE Then
        For i = 1 To n_max
            alpha(i) = alpha_tmp(i)
            eta1(i) = eta_tmp(i)
            eta2(i) = 0#
        Next i
        n_fold = n_max
    Else                            'BOTHDIR is true
        i1 = 0
        Do
            i1 = i1 + 1
            alpha(i1) = alpha_tmp(i1)
            eta1(i1) = eta_tmp(i1)
        Loop Until alpha_tmp(i1 + 1) <= alpha_tmp(i1)

'------ no. of different alpha values
        n_fold = i1

        If alpha_tmp(i1 + 1) = alpha_tmp(i1) Then
            i2 = i1 + 1
        Else
            i2 = i1
        End If
        Do
            i1 = i1 + 1
            i2 = i2 - 1
            eta2(i2) = eta_tmp(i1)
        Loop Until i1 = n_max
    End If

End Sub

Sub StripFilename (fname$)
    Dim j As Integer

    j = 0
    strip$ = fname$
    Do
        strip$ = Right$(strip$, Len(strip$) - j)
        j = InStr(strip$, "\")
    Loop Until j = 0

    StepAmpl.TextFile.text = strip$
    t$ = t$ + strip$ + CRLF$
    t$ = t$ + "--------------------------" + CRLF$
End Sub

Sub FindStep (ndata%, alpha(), eta1(), eta2(), step_yn() As Integer)
    Dim i As Integer

'-- clear array
    For i = 1 To MAX_ELEMENTS
        step_yn(i, 1) = NOSTEP
        step_yn(i, 2) = NOSTEP
    Next i

    For i = 2 To ndata

        If TestStep(eta1(i), eta1(i - 1)) = TRUE Then
            step_yn(i, 1) = CInt(eta1(i) / OMEGA_C)
        End If
        If TestStep(eta2(i), eta2(i - 1)) = TRUE Then
            step_yn(i, 2) = CInt(eta2(i) / OMEGA_C)
        End If

    Next i
End Sub

Sub StepHeight (ndata%, alpha(), eta1(), step_yn() As Integer, col%, STEP_HEIGHT())
    Dim i As Integer
    Dim j As Integer
    Dim order As Integer
    Dim order_min As Integer
```

```
    Dim order_max As Integer
    Dim height As Single

'-- initialize variables
    order_min = CInt(ALPHA_DC_MIN / OMEGA_C)
    order_max = CInt(ALPHA_DC_MAX / OMEGA_C)

    For order = order_min To order_max
        For i = 2 To ndata
            If step_yn(i, 1) = order Or step_yn(i, 2) = order Then

                j = i
                Do
                    j = j + 1
                Loop Until (step_yn(j, 1) <> order And step_yn(j, 2) <> order)

                height = alpha(j - 1) - alpha(i - 1)
                STEP_HEIGHT(order, col) = height

                t$ = t$ + "step: " + Format$(order, F3_0$) + "    height: " + Format$(height, F
6_4$) + CRLF$
                Exit For
            End If
        Next i
    Next order
End Sub

Sub WriteFile (FILE$, STEP_HEIGHT())
    Dim i As Integer
    Dim row As Integer
    Dim ord As Integer
    Dim nstep_min As Integer
    Dim nstep_max As Integer

    Open FILE$ For Output Access Write As #2
        Print #2, "Program: StepAmpl   v.1.0.5"
        Print #2, "Automatic analysis of step height"
        Print #2, "--------------------------------------------------"

        text$ = Format$(Now, "dddd  dd mmmm yyyy")
        Print #2, "Date: "; text$
        text$ = Format$(Now, "hh:mm:ss")
        Print #2, "Time: "; text$
        Print #2,
        text$ = Str$(eps)
        Print #2, "Recognized step interval, eps:"; text$
        Print #2,
        Print #2, "Processed files:"
        Print #2,
        For i = 0 To NLIST
            text$ = Format$(i + 1, "000")
            Print #2, text$; ": "; FILES(i)
        Next i

        Print #2, "--------------------------------------------------"
        Print #2, "Results:"
        Print #2,
        Print #2, "File:"; ","; Spc(3); "Step: -->"
        Print #2, Spc(5);

        nstep_min = Int(ALPHA_DC_MIN / OMEGA_C - 1)
        nstep_max = Int(ALPHA_DC_MAX / OMEGA_C + 1)

        For ord = nstep_min To nstep_max
            text$ = Format$(ord, F3_0$)
            Print #2, ","; Spc(5); text$;
        Next ord
        Print #2,

        For row = 0 To NLIST
            text$ = "   " + Format$(row + 1, F3_0$)
            Print #2, text$;

            For ord = nstep_min To nstep_max
                text$ = Format$(STEP_HEIGHT(ord, row), F6_4$)
                Print #2, ","; Spc(2); text$;
```

```
            Next ord

            Print #2,
        Next row

    Close #2

End Sub

Function TestStep (r, r_old)
    Dim rn As Single

    TestStep = FALSE

'-- test whether r values are on step
    If Abs(r - r_old) <= eps Then

'------ test whether it is an integer step
        rn = CInt(r / OMEGA_C) * OMEGA_C
        If (r <= rn) And (r + eps) >= rn Then
            TestStep = TRUE
        ElseIf (r > rn) And (r - eps) <= rn Then
            TestStep = TRUE
        End If

    End If
End Function
```

```
Sub CommandCancel_Click ()
    Beep
    File.Pattern = "*.stp"
    TextFilename.Text = File.Pattern
    SaveFile.Hide
End Sub

Sub Form_Load ()
    Drive.Drive = Loadfile.Drive.Drive
    Directory.Path = Loadfile.Directory.Path
    TextDirectory.Text = Loadfile.TextDirectory.Text

    File.Path = Directory.Path
    File.Pattern = "*.stp"
    TextFilename.Text = File.Pattern
End Sub

Sub Drive_Change ()
    Directory.Path = Drive.Drive
End Sub

Sub Directory_Change ()
    File.Path = Directory.Path
    TextDirectory.Text = Directory.Path
End Sub

Sub CommandOk_Click ()

    If File.Listcount <> 0 Then
        r = MsgBox("File already exists!" + CRLF$ + "Overwrite?", 4 + 32 + 256, "Save file")
        If r = 7 Then
            File.Pattern = "*.stp"
            TextFilename.Text = File.Pattern
            Exit Sub
        End If
    End If

    file_to_save$ = Directory.Path + "\" + TextFilename.Text
    Call WriteFile(file_to_save$, STEP_HEIGHT())

    File.Pattern = "*.stp"
    TextFilename.Text = File.Pattern
    SaveFile.Hide
    StepAmpl.SetFocus
End Sub

Sub TextFilename_Change ()
    File.Pattern = TextFilename.Text
End Sub

Sub File_Click ()
    TextFilename.Text = File.Filename
End Sub

Sub File_DblClick ()
    TextFilename.Text = File.Filename
End Sub
```