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'////////////////////////////////////////////////////////////////////////
///
'Faz Histograma - Freq Acumulada
Sub Histograma_R(Optional ByVal incells As Variant, Optional ByVal
numclasses As Variant, Optional ByVal outcells As Variant, Optional ByVal
op_plota As Variant)

    Dim r As Range, output As Range, plota As Boolean
    Dim i As Integer, j As Integer
    Dim rmax As Double, rmin As Double, rband As Double
    Dim M As Integer, N As Integer
    Dim cl() As Double
    Dim maisprovavel As Double
    Dim soma As Double, somaq As Double, media As Double, devP As Double,
moda As Double
    Dim NP As Long


    If IsMissing(numclasses) Then
        Set r = Application.InputBox(prompt:="Enter Data Matrix:",
Type:=8)
        M = Application.InputBox(prompt:="Number of classes:",
Default:="20", Type:=1)
        Set output = Application.InputBox(prompt:="Enter Top Column
Output Data:", Type:=8)
        plota = True
    Else
        Set r = incells
        M = numclasses
        Set output = outcells
        plota = op_plota
    End If

    NP = 0
    soma = 0
    somaq = 0
    rmin = 1000000#
    rmax = -1000000#
    For i = 1 To r.Rows.Count
        For j = 1 To r.Columns.Count
            If r(i, j) <> "" Then
                NP = NP + 1
                soma = soma + r(i, j)
                somaq = somaq + r(i, j) ^ 2
                If r(i, j) > rmax Then rmax = r(i, j)
                If r(i, j) < rmin Then rmin = r(i, j)
            End If
        Next j
    Next i

    'NP = r.Rows.Count * r.Columns.Count

    media = soma / NP
    devP = ((somaq - soma ^ 2 / NP) / (NP - 1)) ^ 0.5
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    ReDim cl(M)

    rband = (rmax - rmin) / M

    If rband <> 0 Then
        For i = 1 To r.Rows.Count
            For j = 1 To r.Columns.Count
                If r(i, j) <> "" Then
                    N = Int((r(i, j) - rmin) / rband)
                    cl(N) = cl(N) + 1
                End If
            Next j
        Next i

        j = 0
        For i = 0 To M
            If cl(i) > j Then
                j = cl(i)
                N = i
            End If
        Next i
        moda = rmin + (N + 0.5) * rband
    Else
        moda = 0
    End If
    DoEvents

    j = 1:  output(j, 1) = "M�dia:"
            output(j, 2) = media
            output(j, 3) = "M�ximo:"
            output(j, 4) = rmax
    j = 2:  output(j, 1) = "DesvPad:"
            output(j, 2) = devP
            output(j, 3) = "M�nimo:"
            output(j, 4) = rmin
    j = 3:  output(j, 1) = "Valor"
            output(j, 2) = "Frequ�ncia"
            output(j, 3) = "Freq Acumul"
            output(j, 4) = "Dist Normal"
            output(j, 5) = "Normal Acumul"


    For i = 0 To M
        j = j + 1
        If i < M Then output(j, 1) = rmin + (i + 0.5) * rband Else
output(j, 1) = rmin + i * rband
        output(j, 2) = cl(i) / NP
        If i > 0 Then output(j, 3) = output(j - 1, 3) + cl(i) / NP Else
output(j, 3) = cl(i) / NP

        'output(j, 4) = Exp(-((output(j, 1) - media) / DevP) ^ 2 / 2) /
(2 * pi) ^ 0.5 / DevP / M
        If devP > 0 Then output(j, 5) =
WorksheetFunction.NormDist(output(j, 1) + rband / 2, media, devP, True)
        'If i > 0 Then output(j, 5) = output(j - 1, 5) + output(j, 4)
Else output(j, 5) = output(j, 4)
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        If i > 0 Then output(j, 4) = output(j, 5) - output(j - 1, 5) Else
output(j, 5) = output(j, 5)
    Next i

    'FAz o gr?fico
    If plota Then
        Dim nome
        nome = ActiveSheet.Name
        Charts.Add
        For i = ActiveChart.SeriesCollection.Count To 1 Step -1
                ActiveChart.SeriesCollection(i).Delete
        Next i

        ActiveChart.ChartType = xlXYScatterLinesNoMarkers
        ActiveChart.ChartType = xlXYScatter

        ActiveChart.Location Where:=xlLocationAsObject, Name:=nome


        With ActiveChart
            .SeriesCollection.NewSeries
            .SeriesCollection(1).Name = "Histograma"
            .SeriesCollection(1).XValues = Range(output(4, 1), output(M +
4, 1)) '(valorX)
            .SeriesCollection(1).Values = Range(output(4, 2), output(M +
4, 2)) '(valorY)
            '.SeriesCollection(1).Select
            .SeriesCollection(1).Smooth = True
            .SeriesCollection(1).MarkerStyle = -4142
            .SeriesCollection(1).Format.Line.Weight = 1
            .SeriesCollection(1).Format.Line.ForeColor.RGB = RGB(255, 0,
0)


            .SeriesCollection.NewSeries
            .SeriesCollection(2).Name = "Freq Acumulada"
            .SeriesCollection(2).XValues = Range(output(4, 1), output(M +
4, 1)) '(valorX)
            .SeriesCollection(2).Values = Range(output(4, 3), output(M +
4, 3)) '(valorY)
            '.SeriesCollection(2).Select
            .SeriesCollection(2).Smooth = True
            .SeriesCollection(2).MarkerStyle = -4142
            .SeriesCollection(2).Format.Line.Weight = 1
            .SeriesCollection(2).Format.Line.DashStyle =
msoLineDashDotDot
            .SeriesCollection(2).Format.Line.ForeColor.RGB = RGB(255, 0,
0)


            .SeriesCollection.NewSeries
            .SeriesCollection(3).Name = "Normal"
            .SeriesCollection(3).XValues = Range(output(4, 1), output(M +
4, 1)) '(valorX)
            .SeriesCollection(3).Values = Range(output(4, 4), output(M +
4, 4)) '(valorY)
            '.SeriesCollection(3).Select
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            .SeriesCollection(3).Smooth = True
            .SeriesCollection(3).MarkerStyle = -4142
            .SeriesCollection(3).Format.Line.Weight = 1
            .SeriesCollection(3).Format.Line.ForeColor.RGB = RGB(0, 128,
255)

            .SeriesCollection.NewSeries
            .SeriesCollection(4).Name = "Normal Acumulada"
            .SeriesCollection(4).XValues = Range(output(4, 1), output(M +
4, 1)) '(valorX)
            .SeriesCollection(4).Values = Range(output(4, 5), output(M +
4, 5)) '(valorY)
            '.SeriesCollection(3).Select
            .SeriesCollection(4).Smooth = True
            .SeriesCollection(4).MarkerStyle = -4142
            .SeriesCollection(4).Format.Line.Weight = 1
            .SeriesCollection(4).Format.Line.DashStyle =
msoLineDashDotDot
            .SeriesCollection(4).Format.Line.ForeColor.RGB = RGB(0, 128,
255)



            .Axes(xlCategory, xlPrimary).HasTitle = True
            .Axes(xlValue, xlPrimary).HasTitle = True
            .Axes(xlCategory, xlPrimary).AxisTitle.Characters.Text =
"Valor "
            '.Axes(xlValue, xlPrimary).AxisTitle.Characters.Text = "Power
Density (" & unidade & ")/Hz^0.5"
            .Axes(xlValue, xlPrimary).AxisTitle.Characters.Text = "Freq "

            .HasLegend = False
            .PlotArea.Interior.ColorIndex = xlNone

            '.SetElement (msoElementPrimaryCategoryAxisNone)
            '.SetElement (msoElementPrimaryValueAxisNone)
            .ChartArea.width = 330
            .ChartArea.height = 165
            .ChartArea.Top = output.Top
            .ChartArea.Left = output.Left

            .PlotArea.Top = 15
            .PlotArea.Left = 15
            .PlotArea.width = 315
            .PlotArea.height = 135


        End With

        With ActiveChart.Axes(xlCategory)
            '.MaximumScale = rmax
            '.MinimumScale = -rmax
            .HasMajorGridlines = False
            .HasMinorGridlines = False
            .MajorTickMark = xlInside
            .MinorTickMark = xlInside
            .TickLabelPosition = xlNextToAxis
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        End With
        With ActiveChart.Axes(xlValue)
            '.MaximumScale = 1
            '.MinimumScale = 0
            .HasMajorGridlines = False
            .HasMinorGridlines = False
            .MajorTickMark = xlInside
            .MinorTickMark = xlInside
            .TickLabelPosition = xlNextToAxis
        End With


        ActiveChart.HasAxis(xlValue, xlSecondary) = True
        ActiveChart.SeriesCollection(2).AxisGroup = 2
        ActiveChart.SeriesCollection(4).AxisGroup = 2
        With ActiveChart.Axes(xlValue, xlSecondary)
            .MaximumScale = 1
            .MinimumScale = 0
            .HasMajorGridlines = False
            .HasMinorGridlines = False
            .MajorTickMark = xlInside
            .MinorTickMark = xlInside
            .TickLabelPosition = xlNextToAxis
        End With




        With ActiveChart.TextBoxes.Add(90, 30, 65, 22)
                    .Select
                    .Text = "Total Series Length: " & Str(NP) & Chr(10) &
"Average:" & Format(media, "0.00") _
                            & Chr(10) & "Standard Dev: " & Format(devP,
"0.00") _
                            & Chr(10) & "Most Frequent: " & Format(moda,
"0.00")
                    .AutoSize = True
                    .Font.Size = 9
        End With

        ActiveChart.SetElement (msoElementLegendRightOverlay)
    End If

End Sub
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