SSVE White Balance Data Visualization

20 Dec 2021, SSVE started a trial which is an activity to write White Balance data into Pmod T-Con board.

To ensure effectiveness, PE wanna check log data compared with JND.

This small VBA project helps to accelerate the whole process.

Author

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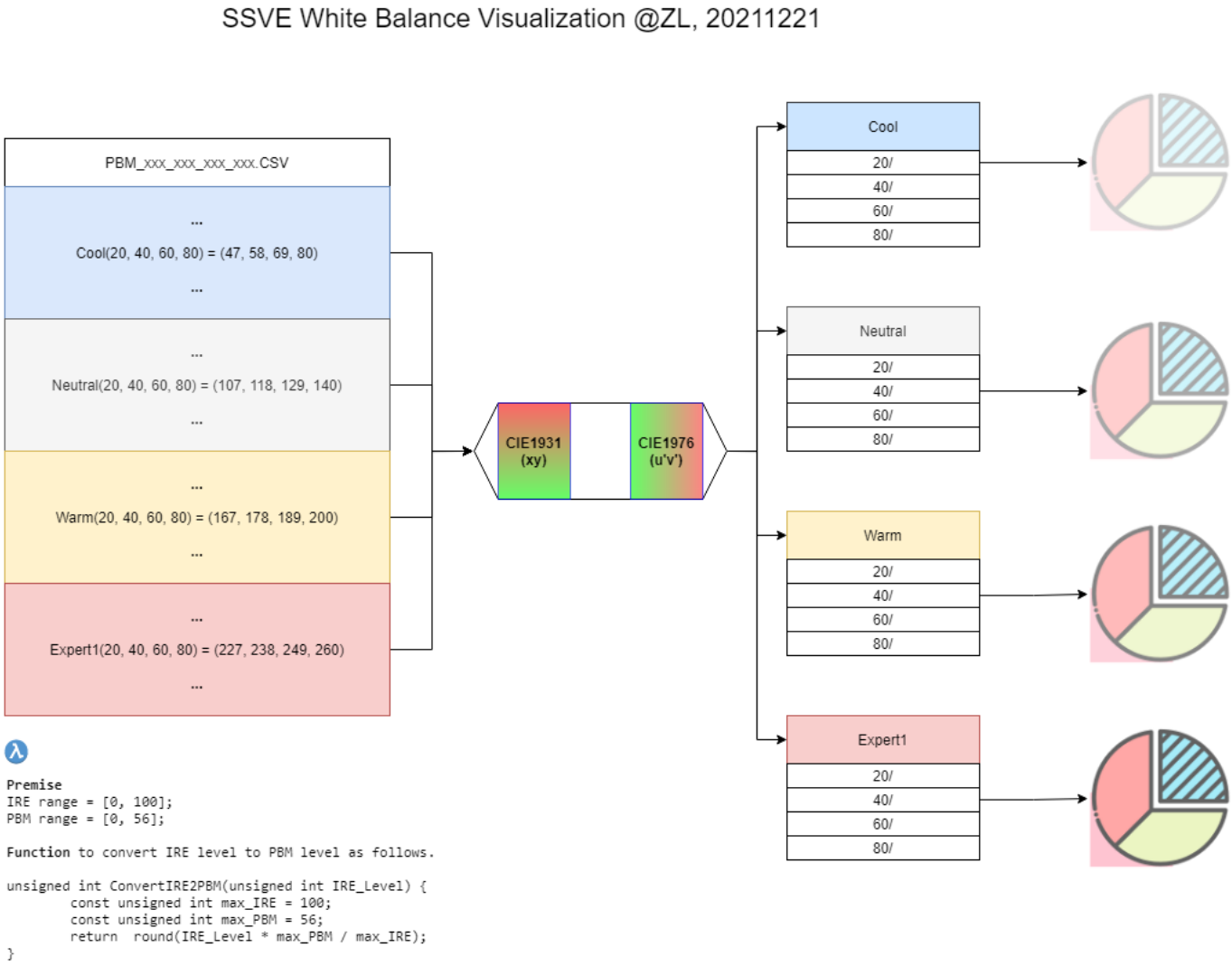
Changelog

- v0.01, initial build
- v0.02, fix visualization bug (screw non-standard charts..)
- v0.03, resize `named range` dynamically
- v0.04, create `Python3` + `Rlang` solution for scaling data and workload;

Diagram

the following the diagram of the whole process



Solution 01

toolkits: VB.NET + Excel + VBA;

using this approach when workload and dataset are small (<= 1,000);

Implementation

some core functionality as follows.

```
Private Sub read_PBM_csv(ByVal csv_path As String, ByRef dstWB As Workbook)
    ''' read data from a PBM csv log files at SSVE @ZL, 20211220
    Const col_x As Integer = 5
    Const col_y As Integer = 6
    Const idx_x As Integer = 0
    Const idx_y As Integer = 1
    Const sheet_no As Integer = 1
    Dim cool, neutral, warm, expert1, color_temps

    cool = Array(47, 58, 69, 80)
```

```
    neutral = Array(107, 118, 129, 140)
    warm = Array(167, 178, 189, 200)
    expert1 = Array(227, 238, 249, 260)

    color_temps = Array(cool, neutral, warm, expert1)

    Dim src_wb As Workbook
    Dim src_ws As Worksheet

    Set src_wb = GetObject(csv_path)
    Set src_ws = src_wb.Worksheets(sheet_no)

    Dim i As Integer
    Const wsn_cool As String = "Cool"
    Const wsn_neutral As String = "Neutral"
    Const wsn_warm As String = "Warm"
    Const wsn_expert1 As String = "Expert1"
    Dim dstWS_cool As Worksheet: Set dstWS_cool = dstWB.Sheets(wsn_cool)
    Dim dstWS_neutral As Worksheet: Set dstWS_neutral = dstWB.Sheets(wsn_neutral)
    Dim dstWS_warm As Worksheet: Set dstWS_warm = dstWB.Sheets(wsn_warm)
    Dim dstWS_expert1 As Worksheet: Set dstWS_expert1 = dstWB.Sheets(wsn_expert1)

    Const lb As Integer = 0
    Const ub As Integer = 3
    Dim dstRow As Integer
    Const dstCol_dt As Integer = 2
    Const dstCol_ser As Integer = 3
    Const dstCol_u As Integer = 7
    Const dstCol_v As Integer = 8

    For i = lb To ub
        dstRow = GetLastRow(dstWS_cool, dstCol_u) + 1
        dstWS_cool.Cells(dstRow, dstCol_ser).Value = dstWS_cool.Cells(dstRow,
dstCol_ser).Value & parse_pbm_fp(csv_path)
        dstWS_cool.Cells(dstRow, dstCol_u).Resize(1, 2) =
ConvXY_to_uv(src_ws.Cells(cool(i), col_x), src_ws.Cells(cool(i), col_y))
' cool

        dstWS_neutral.Cells(dstRow, dstCol_ser).Value =
dstWS_neutral.Cells(dstRow, dstCol_ser).Value & parse_pbm_fp(csv_path)
        dstWS_neutral.Cells(dstRow, dstCol_u).Resize(1, 2) =
ConvXY_to_uv(src_ws.Cells(neutral(i), col_x), src_ws.Cells(neutral(i), col_y))
' neutral

        dstWS_warm.Cells(dstRow, dstCol_ser).Value = dstWS_warm.Cells(dstRow,
dstCol_ser).Value & parse_pbm_fp(csv_path)
        dstWS_warm.Cells(dstRow, dstCol_u).Resize(1, 2) =
ConvXY_to_uv(src_ws.Cells(warm(i), col_x), src_ws.Cells(warm(i), col_y))
' warm

        dstWS_expert1.Cells(dstRow, dstCol_ser).Value =
dstWS_expert1.Cells(dstRow, dstCol_ser).Value & parse_pbm_fp(csv_path)
        dstWS_expert1.Cells(dstRow, dstCol_u).Resize(1, 2) =
ConvXY_to_uv(src_ws.Cells(expert1(i), col_x), src_ws.Cells(expert1(i), col_y))  '
```

```
expert1
    Next i

    src_wb.Close False
    Set src_wb = Nothing
End Sub
```

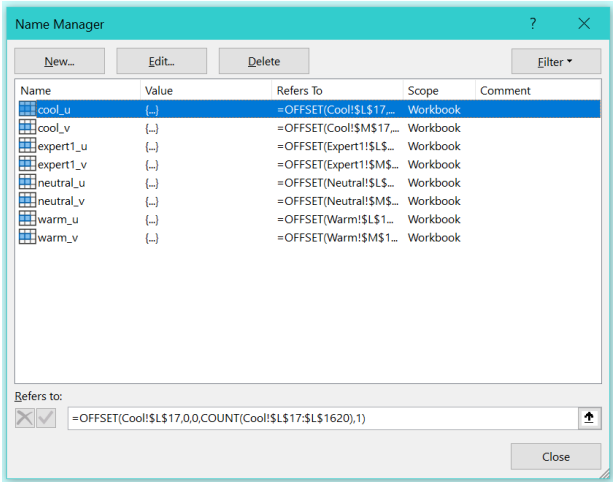
Visualization

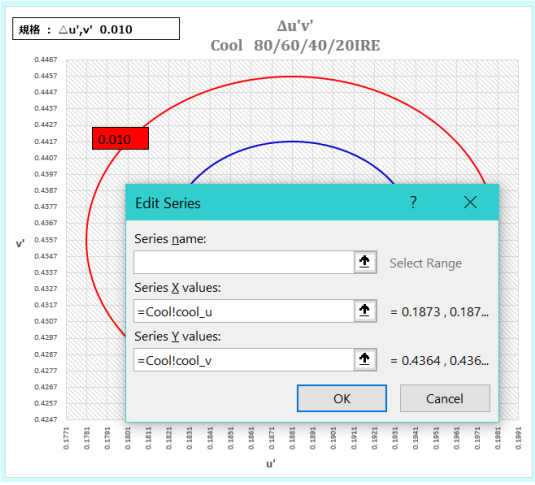
using some tricks to make dynamic charts.

Dynamic Chart

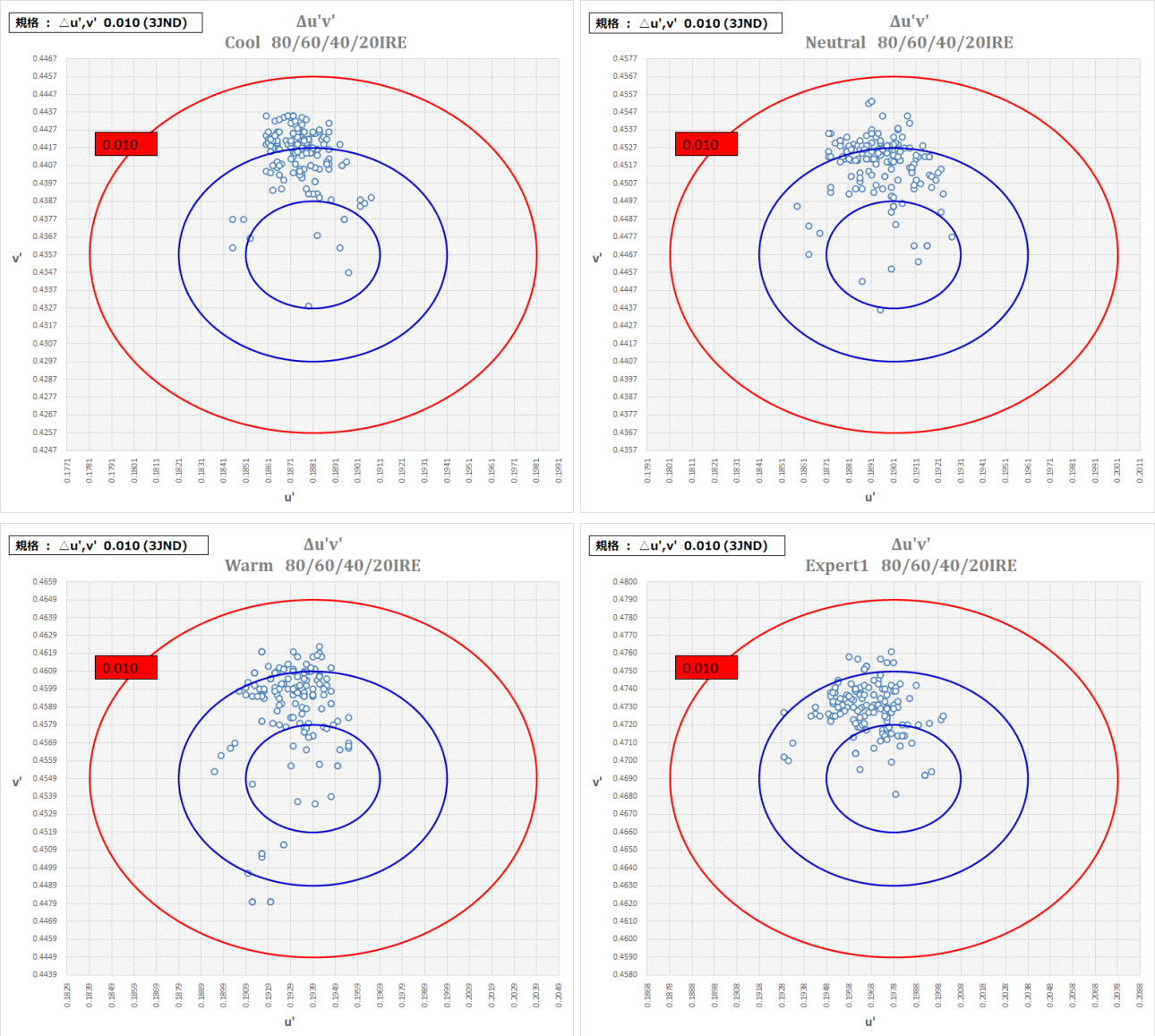
```
''' Dynamic Chart
' [ trick ]
' step1: using Formula -> Define Name to cusomize target series + offset()
function
' step2: using Click Chart -> select data series -> target series

' ref: https://support.microsoft.com/en-us/office/offset-function-c8de19ae-dd79-
4b9b-a14e-b4d906d11b66
' syntax: OFFSET(reference, rows, cols, [height], [width])
```





Gallary



Solution 02

toolkits: Python3 + Pandas + Rlang + ggplot2;

using this approach when workload and dataset are enormous (>=1,000);

Implementation

```
class PBM_Wrangler:
    def __init__(self, pbm:PBM_FileStruct, src_folder:Path, holder:Holder,
offset:float=None) -> None:
        """initialize an instance with a given folder with source PBM_*.CSV log
files inside
        Args:
            src_folder (Path): a given folder with source PBM_*.CSV log files
inside
        """
        self._src_folder  = src_folder
```

```
        self._pbm         = pbm
        self._holder      = holder
        self._offset      = offset

    def _filter(self)->Path:
        for path in sorted(pathlib.Path(self._src_folder).rglob(f'*.
{self._pbm.fn_ext}')):
            if path.name.startswith(self._pbm.fn_prefix):
                yield path.absolute()

    def __read(self, pbm_file:Path)->None:
        df:DataFrame               = pd.read_csv(pbm_file,
skiprows=self._pbm.dummy_rows, engine='python')
        df[self._pbm.head_picmode] = self._pbm.temp_names
        df[self._pbm.head_ser]     = self.__getSer(pbm_file)
        self._holder.temporary     = df[np.isin(df[self._pbm.head_level],
self._pbm.ires)]

    def __getSer(self, pbm_file:Path)->str:
        return pathlib.Path(pbm_file).name.split(self._pbm.fn_sep)
[self._pbm.ser_idx]

    def __categorize(self, color_temp:str, dst_df:List[DataFrame])->None:
        df:DataFrame         =
self._holder.temporary[self._holder.temporary[self._pbm.head_picmode] ==
color_temp].loc[:, self._pbm.head_xy]
        df[self._pbm.head_u] = df.apply(lambda df:
ColorSpace.xy2u(df[self._pbm.head_x], df[self._pbm.head_y], self._offset), axis=1)
        df[self._pbm.head_v] = df.apply(lambda df:
ColorSpace.xy2v(df[self._pbm.head_x], df[self._pbm.head_y], self._offset), axis=1)
        fixed_df:DataFrame   = df.loc[:, self._pbm.head_uv]
        dst_df.append(fixed_df)

    def __wrangle(self)->None:
        for color_temp, df_ct in zip(self._holder.colors,
self._holder.colorTemps):
            self.__categorize(color_temp, df_ct)
        self._holder.reset()

    def __concat(self, color_temp:str, src_df:List[DataFrame])->None:
        df:DataFrame = pd.concat(src_df, ignore_index=True, sort=False)
        df.to_csv(f'./src/{color_temp}.csv', index=False)

    def __tocsv(self)->None:
        for color_temp, df_ct in zip(self._holder.colors,
self._holder.colorTemps):
            if df_ct: self.__concat(color_temp, df_ct)

    @timer
    def work(self)->None:
        logging.info('start working..')
        for pbm_file in self._filter():
            self.__read(pbm_file)
            self.__wrangle()
```

```
        self.__tocsv()
        self._holder.to_sql('./src/raw.db', 'wb')
        # self._holder.to_csv('./src/raw.csv')
        self._holder.reset(how='all')
        logging.info('successed.')
```

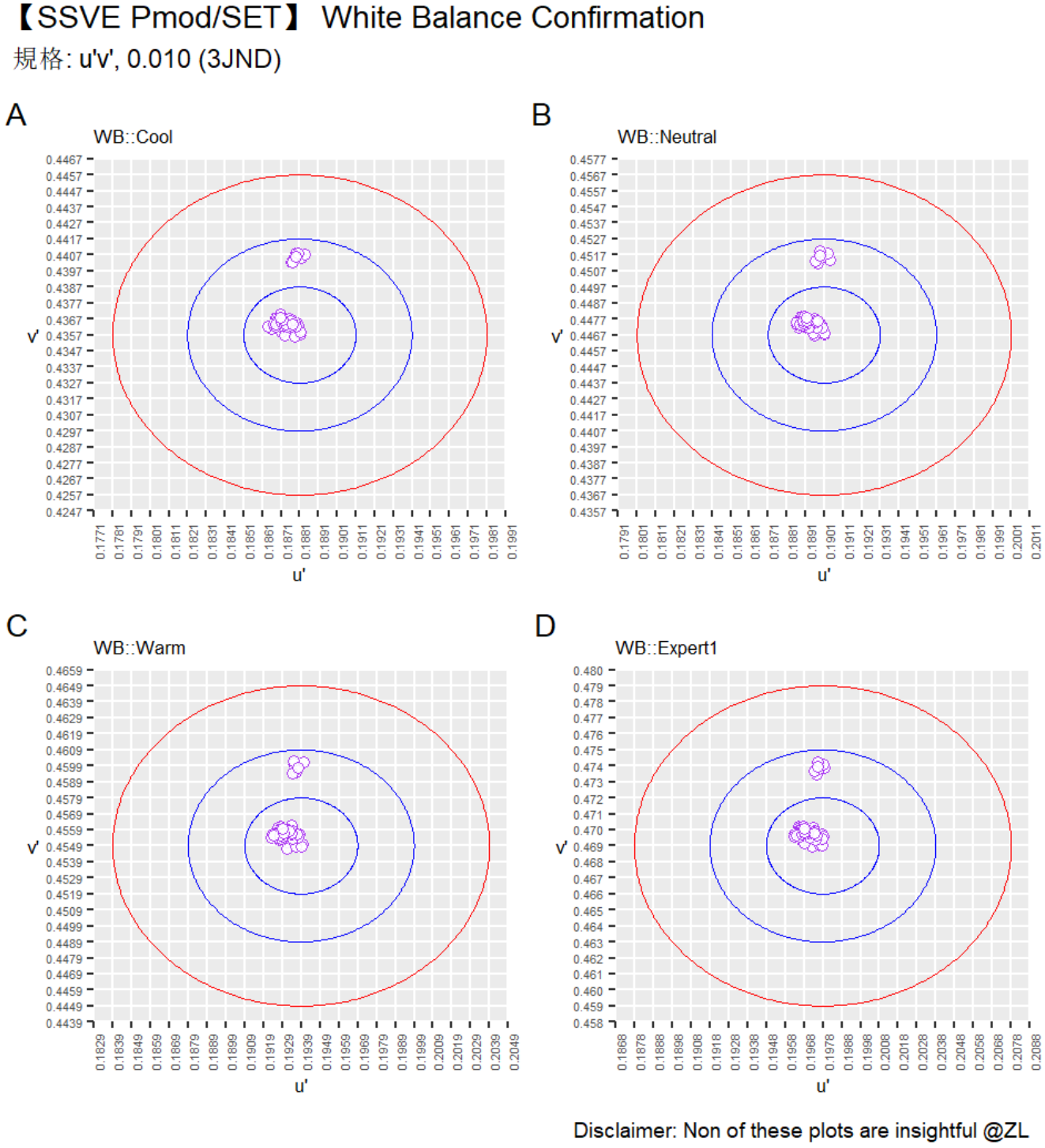
Visualization

```
### plot
plot.wb <- function(df.temp, temp,
                    temp.breaks.x, temp.breaks.y,
                    temp.minor.x, temp.minor.y,
                    temp.jnd1, temp.jnd2, temp.jnd3) {

  p <- ggplot(df.temp) +
    geom_point(aes(x=u,
                   y=v),
               colour = "purple",
               shape = 21,
               fill = 'white',
               stroke = .5,
               alpha = 0.9,
               size = 2) +
  #  coord_cartesian(xlim=c(0.1771, 0.1991),
  #                  ylim=c(0.4247, 0.4467)) +
    scale_x_continuous(breaks = temp.breaks.x,
                       minor_breaks = temp.minor.x) +
    scale_y_continuous(breaks = temp.breaks.y,
                       minor_breaks = temp.minor.y) +
    labs(title=gsub(' ', '', paste('WB::', temp)),
         x="u\'",
         y="v\'") +
    theme(plot.title = element_text(size=8),
          #panel.grid.major.x = element_blank(),
          #panel.grid.major.y = element_blank(),
          panel.grid.minor.x = element_blank(),
          panel.grid.minor.y = element_blank(),
          axis.title.x = element_text(size=8),
          axis.title.y = element_text(angle=0, size=8, vjust=0.5),
          axis.text.x = element_text(angle=90, size=5),
          axis.text.y = element_text(size=5)) +
    geom_path(data=temp.jnd1,
              aes(x=du,
                  y=dv),
              size = 0.2,
              color = 'blue'
              ) +
    geom_path(data=temp.jnd2,
              aes(x=du,
```

```
                    y=dv),
                size = 0.2,
                color = 'blue'
    ) +
    geom_path(data=temp.jnd3,
                aes(x=du,
                    y=dv),
                size = 0.2,
                color = 'red'
    )
#  dev.print(file = gsub(' ', '',paste('Rplot_', temp, '.png')),
#            device = png,
#            width = 800,
#            height = 800)
  return(p)
}
```

Gallary



About

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