Latex Environment to Produce High Quality Figures

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1 EPS Figure

The detail procedure to include a SVG image produced by Inkscape into LATEX is available online in [1].

```
\usepackage{calc}
```

```
\begin{figure}[h!]
\centering

\def\svgscale{1.5}
\input{figures/fig-ideal-dc-collector-grids.pdf_tex}

4
\caption{Ideal dc network}

\label{fig:ideal-dc-network}

end{figure}
```

figures/fig-ideal-dc-collector-grids.tex

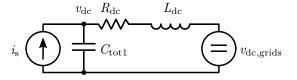


Fig. 1: Ideal dc network

2 Tikz Plot

```
\usepackage{tikz}
\usetikzlibrary{arrows}

\usepackage{pgfplots}

\pgfplotsset{compat=1.9}

4
```

```
length overshoot w zeta 1
1 5379.14 243.0641456 0.138522557 2
2 5612.62 151.1361325 0.170548865 3
3 5793.3 116.1782662 0.239915914 4
```

figures/length-80 Hz. dat

2.1 Coordinate Plot

```
\definecolor \{ mycolor1 \} \{ rgb \} \{ 1,0,0 \} \%
                                                                                                   1
\definecolor{mycolor2}{rgb}{0,1,0}
                                                                                                   2
\definecolor \{mycolor3\} \{rgb\} \{0,0,1\}\%
                                                                                                   3
\definecolor{mycolor4}{rgb}{0,0,0}
                                                                                                   4
\definecolor \{mycolor5\} \{rgb\} \{0.9, 0.5, 0.1\}\%
                                                                                                   5
                                                                                                   6
\begin{figure}[h!]
                                                                                                   7
\centering
                                                                                                   8
\begin{tikzpicture}
                                                                                                   9
\begin { axis } [%
                                                                                                   10
\%width=4.521in,
                                                                                                   11
```

```
\%height=3.566in,
                                                                                           12
\%at = { (0.758 in , 0.481 in ) } ,
                                                                                           13
%scale only axis,
                                                                                           14
xmin=0.45,
                                                                                           15
xmax = 0.75,
                                                                                           16
xlabel style={font=\color{white!15!black}},
                                                                                           17
xlabel = \{Time(s)\},
                                                                                           18
\%ymin=3000,
                                                                                           19
\%ymax=7000,
                                                                                           20
ylabel style = \{font = \setminus color \{white! 15! black \}\},\
                                                                                           21
ylabel={Voltage (V)},
                                                                                           22
axis background /. style={fill=white},
                                                                                           23
legend style={legend cell align=left, anchor=north},
                                                                                           24
legend pos=north east,
                                                                                           25
]
                                                                                           26
                                                                                           27
\addplot [color=mycolor1] table [x=time,
                                                                                           28
   y=simple | { comparation-n-section-cable.dat };
\addlegendentry {N=1}
                                                                                           29
                                                                                           30
\addplot [color=mycolor3] table [x=time,
                                                                                           31
   y=10-section | { comparation-n-section-cable.dat };
\addlegendentry {N=10}
                                                                                           32
                                                                                           33
\end{axis}
                                                                                           34
\end{tikzpicture}
                                                                                           35
\caption{Validation of the number of sections of pi-cable-model in the time
                                                                                           36
   domain }
\label{fig:validation-section-cable}
                                                                                           37
\end{figure}
                                                                                           38
```

figures/coordinate-plot.tex

2.2 3D Plot

```
\begin{figure}[h!]
                                                                                         1
                                                                                         2
\centering
\begin{tikzpicture}
                                                                                         3
\begin{axis}[
                                                                                         4
xlabel=cable length (km), ylabel=output capacitor (mF), zlabel=voltage (V),
                                                                                         5
ymin=1,
                                                                                         6
ymax=3,
                                                                                         7
                                                                                         8
\addplot3[surf] file { plot/threeD-plot.dat };
                                                                                         9
\end{axis}
                                                                                         10
\end{tikzpicture}
                                                                                         11
\caption {3D Plot}
                                                                                         12
\label{fig-threeD-plot}
                                                                                         13
\end{figure}
                                                                                         14
```

plot/threeD-plot.tex

```
\% x = cable length (km)
                                                                                                 1
\% y = output capacitor (mF)
                                                                                                 2
\% z = magnitude (v)
                                                                                                 3
                                                                                                 4
                                                                                                 5
% 1 mF
                                                                                                 6
1 1 5500
                                                                                                 7
2 1 5400
                                                                                                 8
3 1 5300
                                                                                                 9
                                                                                                 10
\% 2 mF
                                                                                                 11
1 \ 2 \ 5400
                                                                                                 12
2 \ 2 \ 5300
                                                                                                 13
3 2 5200
                                                                                                 14
                                                                                                 15
\% 3 mF
                                                                                                 16
1 3 5300
                                                                                                 17
2 \ 3 \ 5200
                                                                                                 18
3 3 5100
                                                                                                 19
```

plot/threeD-plot.dat

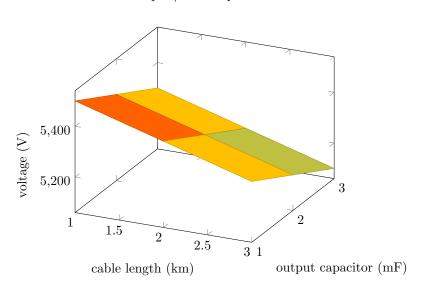


Fig. 2: 3D Plot

2.3 Bar Plot

```
\begin{figure}[h!]
                                                                                         1
\centering
                                                                                         2
\begin{tikzpicture}
                                                                                         3
\begin{axis}[
                                                                                         4
                                                                                         5
ybar,
xlabel=Cable Length (km),
                                                                                         6
enlargelimits = 0.15,
                                                                                         7
ylabel=Voltage (V),
                                                                                         8
legend pos=north west,
                                                                                         9
                                                                                         10
```

```
\addplot table [x=length, y=overshoot]{figures/length-80Hz.dat};
                                                                                             11
\addplot table [x=length, y=overshoot] { figures/length-100Hz.dat };
                                                                                             12
\addplot table [x=length, y=overshoot] { figures/length-200Hz.dat };
                                                                                             13
                                                                                             14
\left( \frac{s + text}{f}_{-1} \right) = 80 Hz, \left( \frac{f}_{-1} \right) = 100 Hz, \left( \frac{f}_{-1} \right) = 100
                                                                                             15
   b = 200  Hz
\end{axis}
                                                                                             16
\end{tikzpicture}
                                                                                             17
\caption{Overshoot voltage at different cable length and control bandwidth}
                                                                                             18
\label{fig:overshoot-voltage}
                                                                                             19
\end{figure}
                                                                                             20
```

figures/bar-plot.tex

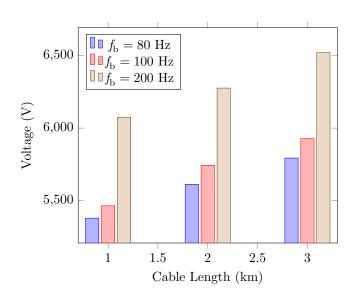


Fig. 3: Overshoot voltage at different cable length and control bandwidth

2.4 Bode Plot

```
\definecolor{mycolor1}{rgb}{1,0,0}
                                                                                                   1
\definecolor \{mycolor2\} \{rgb\} \{0,1,0\}\%
                                                                                                   2
\definecolor \{mycolor3\} \{rgb\} \{0,0,1\}\%
                                                                                                   3
\definecolor \{mycolor4\} \{rgb\} \{0,0,0\}\%
                                                                                                   4
\definecolor \{ mycolor5 \} \{ rgb \} \{ 0.9, 0.5, 0.1 \} \%
                                                                                                   5
                                                                                                   6
\begin{figure}[h!]
                                                                                                   7
\centering
                                                                                                   8
\begin{tikzpicture}
                                                                                                   9
                                                                                                   10
\begin { axis } [%
                                                                                                   11
width=3in,
                                                                                                   12
height=1.4in,
                                                                                                   13
at = \{(2.4 in, 4.765 in)\},\
                                                                                                   14
scale only axis,
                                                                                                   15
separate axis lines,
                                                                                                   16
every outer x axis line /.append style={white!0!black},
                                                                                                   17
```

```
every x tick label/.append style={font=\color{white!0!black}},
                                                                                         18
every x tick/.append style={white!0!black},
                                                                                         19
xmode=log,
                                                                                         20
xmin=1,
                                                                                         21
xmax = 10000,
                                                                                         22
xtick = \{0.1, 1, 10, 100, 1000, 10000\},\
                                                                                         23
xticklabels={\empty},
                                                                                         24
xminorticks=true,
                                                                                         25
every outer y axis line /.append style={white!0!black},
                                                                                         26
every y tick label/.append style={font=\color{white!0!black}},
                                                                                         27
every y tick/.append style={white!0!black},
                                                                                         28
ymin = -50,
                                                                                         29
ymax=35,
                                                                                         30
ylabel={Magnitude (dB)},
                                                                                         31
axis background /. style={fill=white},
                                                                                         32
xmajorgrids,
                                                                                         33
xminorgrids,
                                                                                         34
ymajorgrids,
                                                                                         35
                                                                                         36
                                                                                         37
\addplot [color=mycolor1] table [x=frequency, y=magnitude] { figures/plecs.dat };
                                                                                         38
\addplot [color=mycolor3] table [x=frequency,
                                                                                         39
   y=magnitude | { figures / analytical.dat };
                                                                                         40
\end{axis}
                                                                                         41
                                                                                         42
\begin { axis } [%
                                                                                         43
width=3in,
                                                                                         44
height=1.4in,
                                                                                         45
at = \{(2.4 in, 3.2 in)\},\
                                                                                         46
scale only axis,
                                                                                         47
separate axis lines,
                                                                                         48
every outer x axis line/.append style={white!0!black},
                                                                                         49
every x tick label/.append style={font=\color{white!0!black}},
                                                                                         50
every x tick/.append style={white!0!black},
                                                                                         51
xmode=log,
                                                                                         52
xmin=1,
                                                                                         53
xmax = 10000,
                                                                                         54
xminorticks=true,
                                                                                         55
every outer y axis line /.append style={white!0!black},
                                                                                         56
every y tick label/.append style={font=\color{white!0!black}},
                                                                                         57
every y tick/.append style={white!0!black},
                                                                                         58
ymin = -91.8,
                                                                                         59
ymax=90,
                                                                                         60
ytick = \{-90, 0, 90, 180, 270\},\
                                                                                         61
ylabel={Phase (deg)},
                                                                                         62
axis background /. style={fill=white},
                                                                                         63
                                                                                         64
xmajorgrids,
                                                                                         65
xminorgrids,
```

```
ymajorgrids,
                                                                                                   66
\label{eq:legend_style} $$ \ensuremath{\text{glegend}}$ \ \ cell \ \ align=left \ , \ \ draw=white! 15! \ black \ \} \ ,
                                                                                                  67
\mathscr{S}_{end} style=\{at = \{(1.2,1)\}, legend cell align=left, anchor=north\}
                                                                                                   68
legend style={legend cell align=left, anchor=north},
                                                                                                   69
legend pos=north east,
                                                                                                   70
1
                                                                                                   71
                                                                                                   72
\addplot [color=mycolor1] table [x=frequency, y=phase] { figures/plecs.dat };
                                                                                                   73
\addlegendentry { plecs }
                                                                                                   74
                                                                                                   75
\addplot [color=mycolor3] table [x=frequency, y=phase] { figures / analytical.dat };
                                                                                                   76
\addlegendentry { analytical }
                                                                                                   77
                                                                                                   78
\end{axis}
                                                                                                   79
                                                                                                   80
\begin { axis } [%
                                                                                                   81
width=3in,
                                                                                                   82
height=3.1in,
                                                                                                   83
at = \{(2.275 in, 3 in)\},\
                                                                                                   84
scale only axis,
                                                                                                   85
xmin=0,
                                                                                                   86
xmax=1,
                                                                                                   87
xtick = \{ \setminus empty \},
                                                                                                   88
xlabel = \{Frequency (Hz)\},\
                                                                                                   89
vmin=0,
                                                                                                  90
ymax=1,
                                                                                                  91
ytick = \{ \text{empty} \},
                                                                                                  92
axis line style={draw=none},
                                                                                                  93
ticks=none,
                                                                                                   94
title style={font=\bfseries},
                                                                                                  95
\%title={\{Z_{-} \text{textrm} \{in\} \} compared to \{Z_{-} \text{textrm} \{o\} \},
                                                                                                  96
axis x line*=bottom,
                                                                                                   97
axis y line*=left,
                                                                                                   98
                                                                                                  99
\end{axis}
                                                                                                   100
\end{tikzpicture}
                                                                                                   101
\caption{Validation of the circuit without the output impedance of the current
                                                                                                   102
\label{fig:validation-without-parallel-damping}
                                                                                                   103
\end{figure}
                                                                                                   104
```

figures/bode-plot.tex

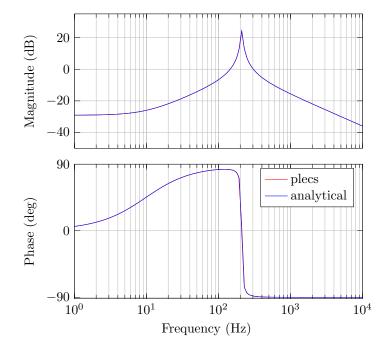


Fig. 4: Validation of the circuit without the output impedance of the current source

References

[1] J. B. C. Engelen, "How to include an svg image in latex," Available at http://tug.ctan.org/info/svg-inkscape/InkscapePDFLaTeX.pdf(2018/04/07).