

R for cytometry - plotting

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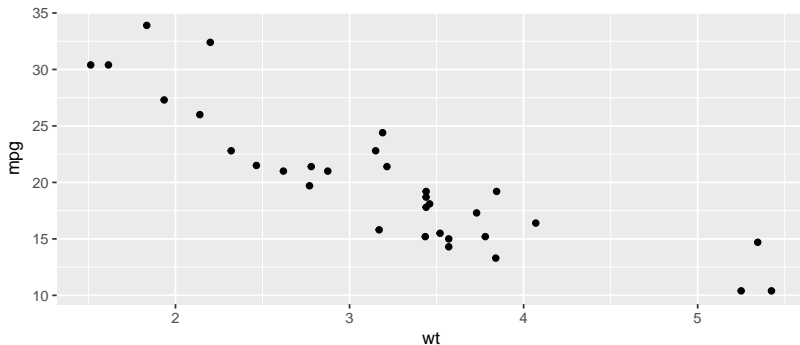
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plotting with R

- ▶ Plotting commands from different algorithms
- ▶ `ggplot`

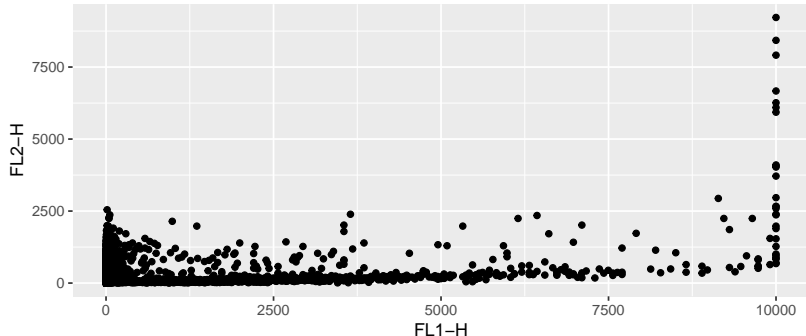
ggplot simple example

```
require(ggplot2)
ggplot(mtcars, aes(x = wt, y = mpg)) +
  geom_point()
```



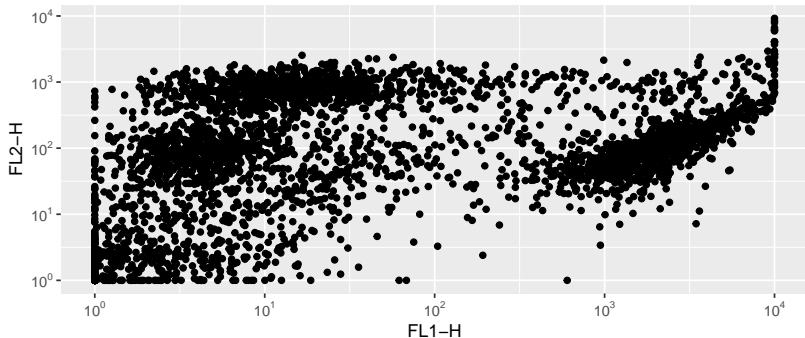
ggplot with flow data

```
require(flowCore)
data(GvHD)
frame <- GvHD[[1]]
df <- as.data.frame(frame@exprs)
ggplot(df, aes(x = `FL1-H`, y = `FL2-H`)) +
  geom_point()
```



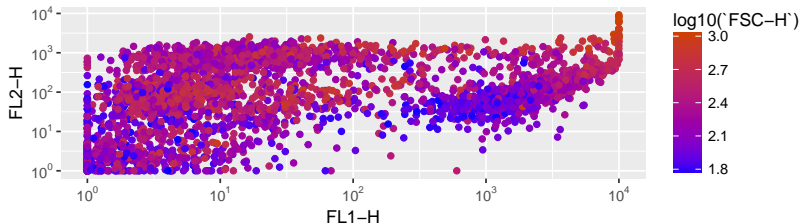
log scales

```
require(scales)
ggplot(df, aes(x = `FL1-H`, y = `FL2-H`)) +
  geom_point() +
  scale_x_log10(breaks = 10^(0:5),
    labels = trans_format("log10", math_format(10^.x))) +
  scale_y_log10(breaks = 10^(0:5),
    labels = trans_format("log10", math_format(10^.x)))
```



colors

```
require(scales)
ggplot(df, aes(x = `FL1-H`, y = `FL2-H`,
               color = log10(`FSC-H`))) +
  geom_point() +
  scale_x_log10(breaks = 10^(0:5),
               labels = trans_format("log10", math_format(10^.x))) +
  scale_y_log10(breaks = 10^(0:5),
               labels = trans_format("log10", math_format(10^.x))) +
  scale_color_gradient(low = "#0000FF", high = "#CD4000")
```

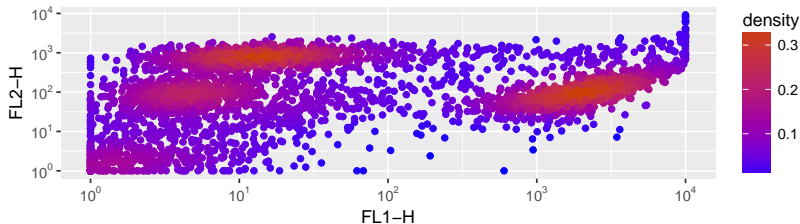


density

```
require(MASS)
get_density <- function(x, y, n = 100){
  dens <- kde2d(x = x, y = y, n = n)
  ix <- findInterval(x, dens$x)
  iy <- findInterval(y, dens$y)
  dens$z[cbind(ix, iy)]
}
```

density colors

```
ggplot(df, aes(x = `FL1-H`, y = `FL2-H`,  
  color = get_density(log10(`FL1-H`), log10(`FL2-H`)))) +  
  geom_point() +  
  scale_x_log10(breaks = 10^(0:5),  
    labels = trans_format("log10", math_format(10^.x))) +  
  scale_y_log10(breaks = 10^(0:5),  
    labels = trans_format("log10", math_format(10^.x))) +  
  scale_color_gradient(name = "density",  
    low = "#0000FF", high = "#CD4000")
```

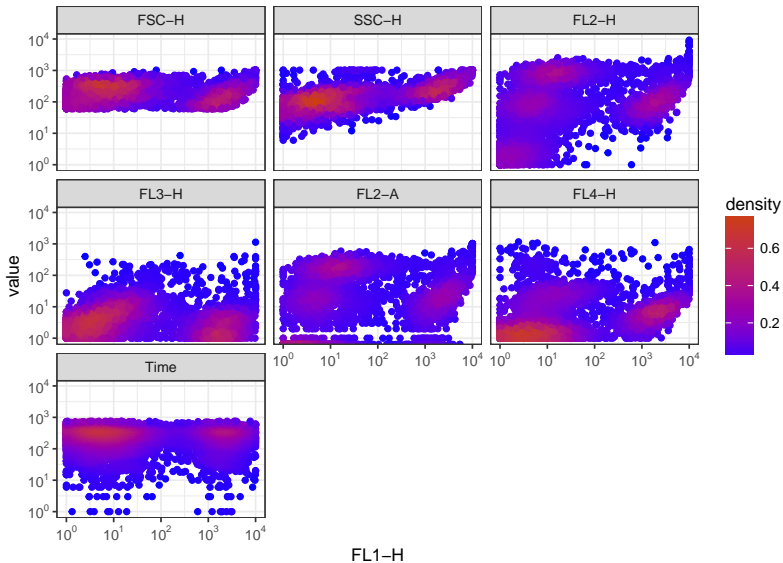


multiple plots at same time

```
require(reshape2)
require(dplyr)
df_melt <- melt(df, id.vars = "FL1-H")
df_melt <- mutate(group_by(df_melt, variable),
  density = get_density(log10(`FL1-H` + 1),
    log10(value + 1)))
p <- ggplot(df_melt, aes(x = `FL1-H`, y = value,
  color = density)) +
  geom_point() +
  scale_x_log10(breaks = 10^(0:5),
    labels = trans_format("log10", math_format(10^.x))) +
  scale_y_log10(breaks = 10^(0:5),
    labels = trans_format("log10", math_format(10^.x))) +
  scale_color_gradient(name = "density",
    low = "#0000FF", high = "#CD4000") +
  facet_wrap(~variable) +
  theme_bw()
```

multiple plots at same time

```
print(p)
```



further reading

Have a look at the following:

```
?geom_line  
?geom_abline  
?geom_smooth  
?geom_linerange  
?geom_boxplot  
?geom_histogram  
?geom_text
```

Also this tutorial.