Figure 2 of the GERP paper

```
#setwd("~/Documents/Github/pvpDiallel/")
knitr::opts_knit$set(root.dir=normalizePath('../'))
```

To reproduce the figures, we should set `pvpDiallel` as the root path, i.e. `setwd("~/Documents/Github/pvpDiallel/")`. And then use `knitr` package to get a pdf file. Or simply click `Knit PDF` icon on `RStudio`. Note, to produce panels into seperate pdf files, we should set `getpdf` into `TRUE` (i.e. `getpdf=TRUE`) when calling the plotting functions.

First of all, determine fond size and set the getpdf option:

```
#par(mar=c(5,4,4,2))
par(font=2, font.lab=2, font.axis=2)
fs = 1.6 # times bigger than default
fsize = 16 # absolute font size
getpdf = TRUE # get figures in seperated pdf [TRUE] or not [FALSE]
```
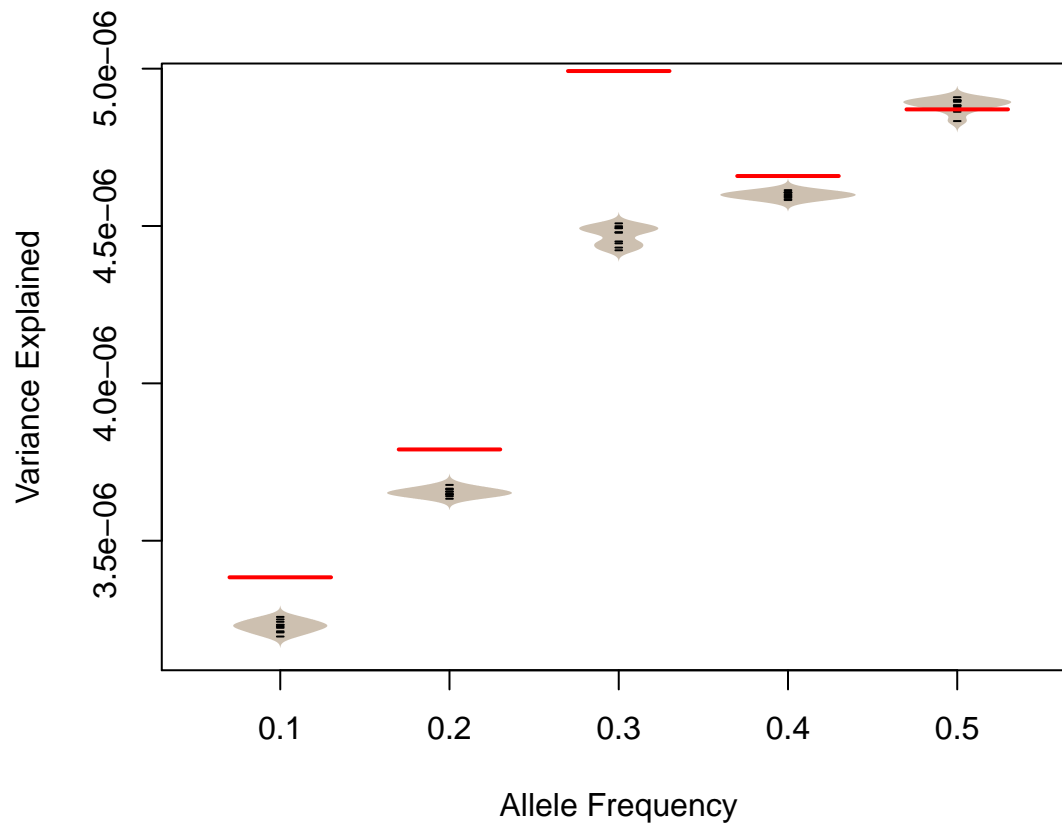

Figure 2a

```
plot_fig2a <- function(outfile, getpdf){
  library("beanplot")
  res <- read.csv("cache/persnp_var_perse.csv")
  myd <- subset(res, sample != 0)
  myd0 <- subset(res, sample == 0)

  #### for trait perse
  beanplot(nvar ~ frq1, data = myd, ll = 0.04, cex=1.5, border = NA,
        what=c(0, 1, 0, 1), col=c(c("antiquewhite3", "black")), cex=fs,
        xlab="Allele Frequency", ylab="Variance Explained" )
  for(i in 1:nrow(myd0)){
    lines(x=c(i-0.3, i+0.3), y=c(myd0$nvar[i], myd0$nvar[i]), lwd=2, col="red")
  }

  if(getpdf == TRUE){
    pdf(outfile, width=5, height=5)
    #### for trait perse
    par(font=2, font.lab=2, font.axis=2, cex.lab=fs)
    beanplot(nvar ~ frq1, data = myd, ll = 0.04, border = NA,
          what=c(0, 1, 0, 1), col=c(c("antiquewhite3", "black")),
          xlab="Allele Frequency", ylab="Variance Explained" )
    for(i in 1:nrow(myd0)){
      lines(x=c(i-0.3, i+0.3), y=c(myd0$nvar[i], myd0$nvar[i]), lwd=2, col="red")
    }
    dev.off()
  }
}
```

```
########
plot_fig2a(outfile="graphs/Fig2a_del_snps.pdf", getpdf)
```



```
## pdf
##   2
```

Figure 2b

```
library(ggplot2)
```

```
## Warning: package 'ggplot2' was built under R version 3.2.4
```

```
library(reshape2)
source("lib/multiplot.R")

plot_eff <- function(outfile, getpdf){
  res1 <- read.csv("cache/gblup_var.csv")
  res2 <- read.csv("cache/kval_perse_5x.csv")
  med <- read.csv("cache/loh_pBPHmax_median.csv")
  bymed <- med[order(med$h),]

  #######
```

```
theme_set(theme_grey(base_size = 18))

res2$trait <- toupper(res2$trait)
res2$trait <- factor(res2$trait, levels=bymed$trait)
p2 <- ggplot(data=res2) +
  geom_density(aes(x= k, y=-..scaled.., fill= as.factor(trait)) ) +
  #guides(fill=FALSE) +
  labs(y=NULL, fill="Traits") + theme_bw() +
  theme(axis.text.x=element_blank(), axis.ticks.x=element_blank(),
        axis.text=element_text(size=fsize),
        axis.title=element_text(size=fsize, face="bold"),
        legend.title = element_text(size=fsize, face="bold"),
        legend.text = element_text(size=fsize)) +
  coord_flip() + xlab("Degree of Dominance (k)") + ylab("") + facet_grid(~ trait)


  return(p2)
}


########
p <- plot_eff(outfile="graphs/Fig2b_var.pdf", getpdf)
p
```
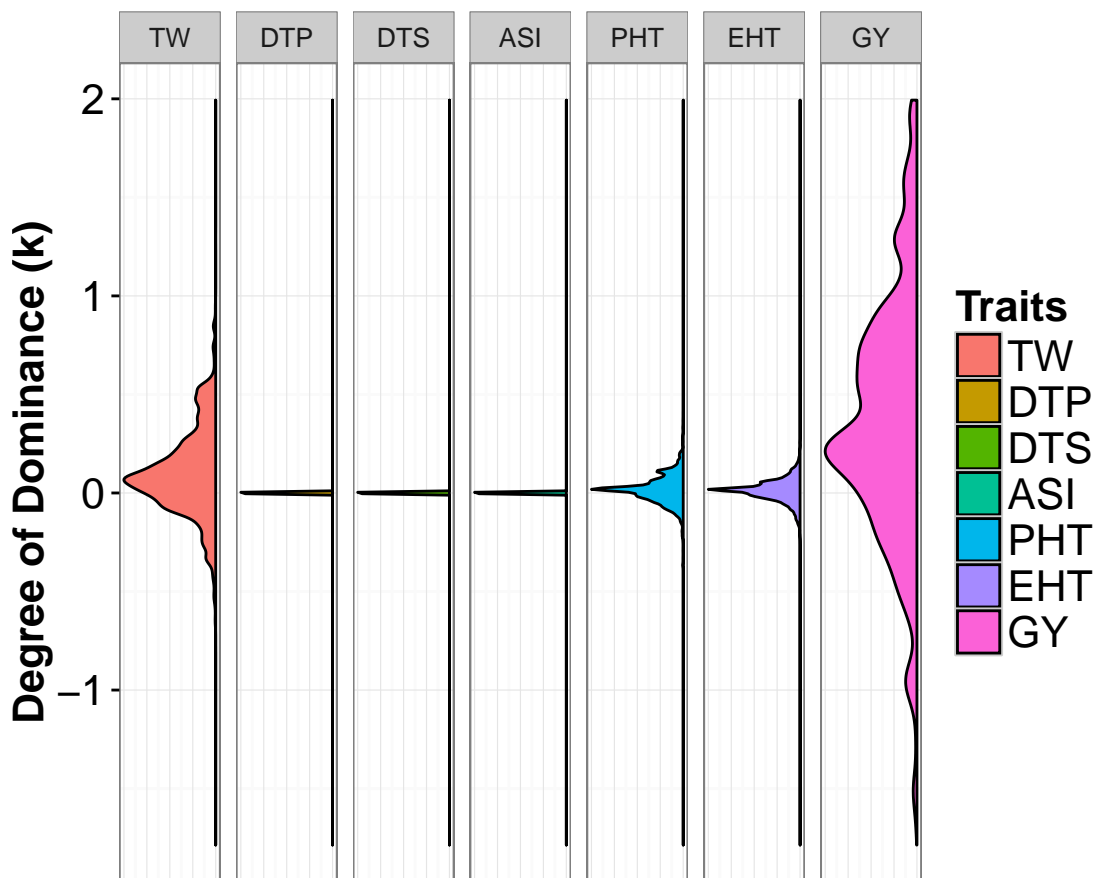
```
if(getpdf){
    pdf("graphs/Fig2b_var.pdf", width=8, height=4)
    p
    dev.off()
}
```

```
## pdf
##   2
```

Figure 2c-e

```
library(wesanderson)
library(data.table)
```

```
##
## Attaching package: 'data.table'
```

```
## The following objects are masked from 'package:reshape2':
##
##     dcast, melt
```

```
source("lib/multiplot.R")

plot_adk_gerp <- function(outfile, getpdf){

  dat <- fread("largedata/gerpdat1x.csv", data.table=FALSE)
  dat$trait <- toupper(dat$trait)
  med2 <- read.csv("cache/loh_pBPHmax_median.csv")
  out <- read.csv("cache/eff_adk_1x.csv")
  #cols <- wes_palette(7, name = "Zissou", type = "continuous")
  cols <- c("#f6546a", "#daa520", "#00ff00", "#66cdaa", "#3b5998", "#8a2be2", "#ff00ff")
  theme_set(theme_grey(base_size = 18))

  getlty <- function(df, eff, cutoff=0.05){
    df$l <- 2
    if(nrow(df[df[, eff] < cutoff, ]) >0) df[df[, eff] < cutoff, ]$l <- 1
    return(df)
  }

  lty1 <- getlty(df=out, eff="effa", cutoff=0.05)$l
  p1 <- ggplot(dat, aes(x=RS, y=Effect_A, colour=factor(trait, levels=med2$trait),
                        linetype=factor(trait, levels=med2$trait))) +
    labs(colour="Traits") +
    theme_bw() +
    xlab("GERP Score") +
    ylab("Additive Effect") +
    scale_color_manual(values=cols) +
    scale_linetype_manual(values=lty1) +
    guides(colour=FALSE, linetype=FALSE) +
```

```r
    geom_smooth(method="gam", size=1.3) +
    theme(axis.text.y = element_text(angle = 90, hjust = 1),
          axis.text=element_text(size=fsize),
          axis.title=element_text(size=fsize, face="bold"),
          legend.title = element_text(size=fsize, face="bold"),
          legend.text = element_text(size=fsize))

  lty2 <- getlty(df=out, eff="effd", cutoff=0.05)$l
  p2 <- ggplot(dat, aes(x=RS, y=Effect_D, colour=factor(trait, levels=med2$trait),
                        linetype=factor(trait, levels=med2$trait))) +
    labs(colour="Traits") +
    theme_bw() +
    xlab("GERP Score") +
    ylab("Dominant Effect") +
    scale_color_manual(values=cols) +
    scale_linetype_manual(values=lty2) +
    guides(colour=FALSE, linetype=FALSE) +
    geom_smooth(method="gam", size=1.3) +  # Add linear regression line
    theme(axis.text.y = element_text(angle = 90, hjust = 1),
          axis.text=element_text(size=fsize),
          axis.title=element_text(size=fsize, face="bold"),
          legend.title = element_text(size=fsize, face="bold"),
          legend.text = element_text(size=fsize))

  lty3 <- getlty(df=out, eff="effk", cutoff=0.05)$l
  p3 <- ggplot(dat, aes(x=RS, y=k, colour=factor(trait, levels=med2$trait),
                        linetype=factor(trait, levels=med2$trait))) +
    labs(colour="Traits") +
    theme_bw() +
    xlab("GERP Score") +
    ylab("Degree of Domiance (k)") +
    scale_color_manual(values=cols) +
    scale_linetype_manual(values=lty3) +
    guides(colour=FALSE, linetype=FALSE) +
    theme(axis.text.y = element_text(angle = 90, hjust = 1),
          axis.text=element_text(size=fsize),
          axis.title=element_text(size=fsize, face="bold"),
          legend.title = element_text(size=fsize, face="bold"),
          legend.text = element_text(size=fsize)) +
    geom_smooth(method="gam", size=1.3)   # Add linear regression line

  multiplot(p1, p2, p3, cols=3)
  if(getpdf == TRUE){
    pdf(outfile, width=13, height=4)
    multiplot(p1, p2, p3, cols=3)
    dev.off()
  }

}


####
plot_adk_gerp(outfile="graphs/Fig2c-e_adk.pdf", getpdf)
```
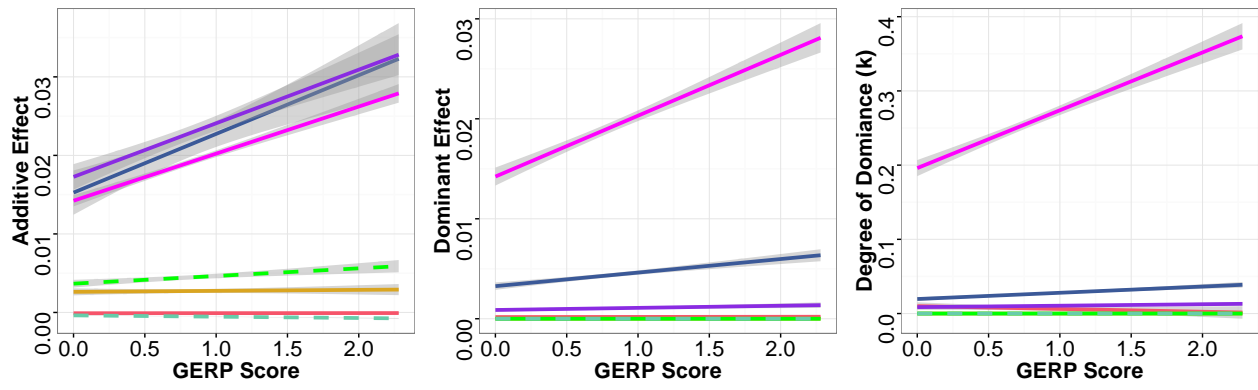
```
## pdf
##   2
```