Exploratory analyses of simplex output

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Clear and set the working directory

```
rm(list=ls())
getwd()
setwd("~/GitHub/simplex")
```

Import packages; install if needed

```
#install.packages("vegan")
require("vegan")
library(ggplot2)
```

Import custom modules of R functions

```
## Loading files with plotting and diversity functions
source("~/GitHub/simplex/tools/Rbin/metrics.R")
```

Import simulated data

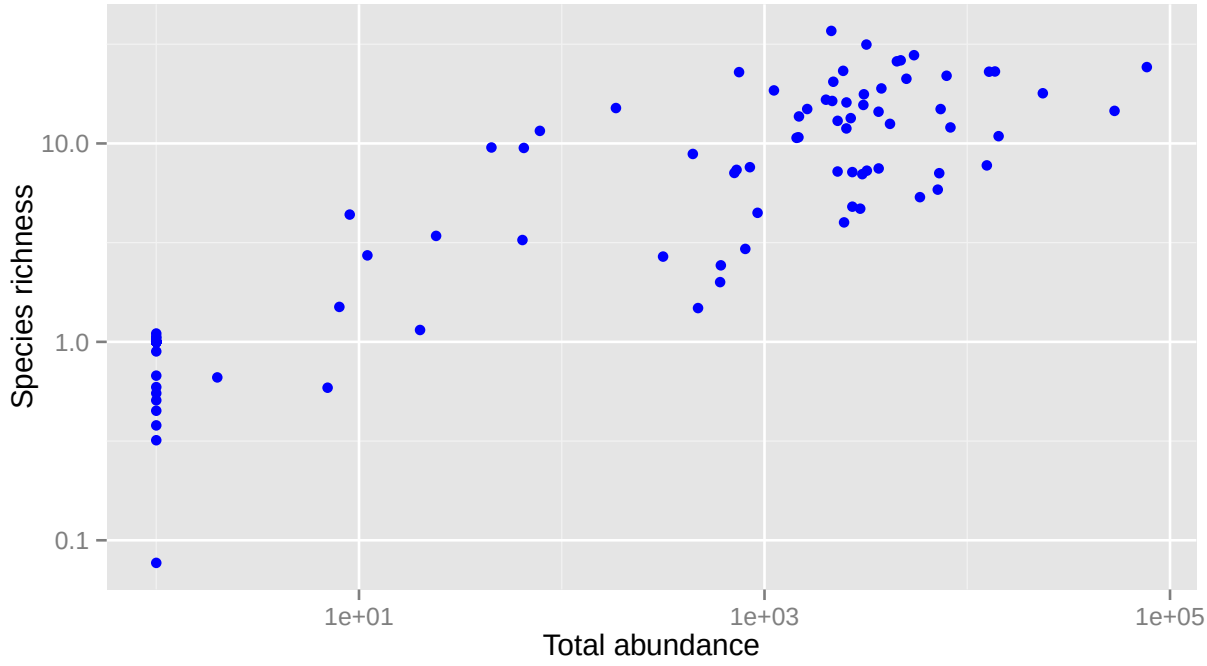
```
## Load Data
dat <- read.csv("~/GitHub/simplex/results/simulated_data/examples/SimData.csv")
ind.rtds <- get.vectors("~/GitHub/simplex/results/simulated_data/examples/IndRTD.csv")
res.rtds <- get.vectors("~/GitHub/simplex/results/simulated_data/examples/ResRTD.csv")
tracer.rtds <- get.vectors("~/GitHub/simplex/results/simulated_data/examples/TracerRTD.csv")
species.list <- get.vectors("~/GitHub/simplex/results/simulated_data/examples/Species.csv")
rads <- get.vectors("~/GitHub/simplex/results/simulated_data/examples/RADs.csv")
```

Exploratory Analyses

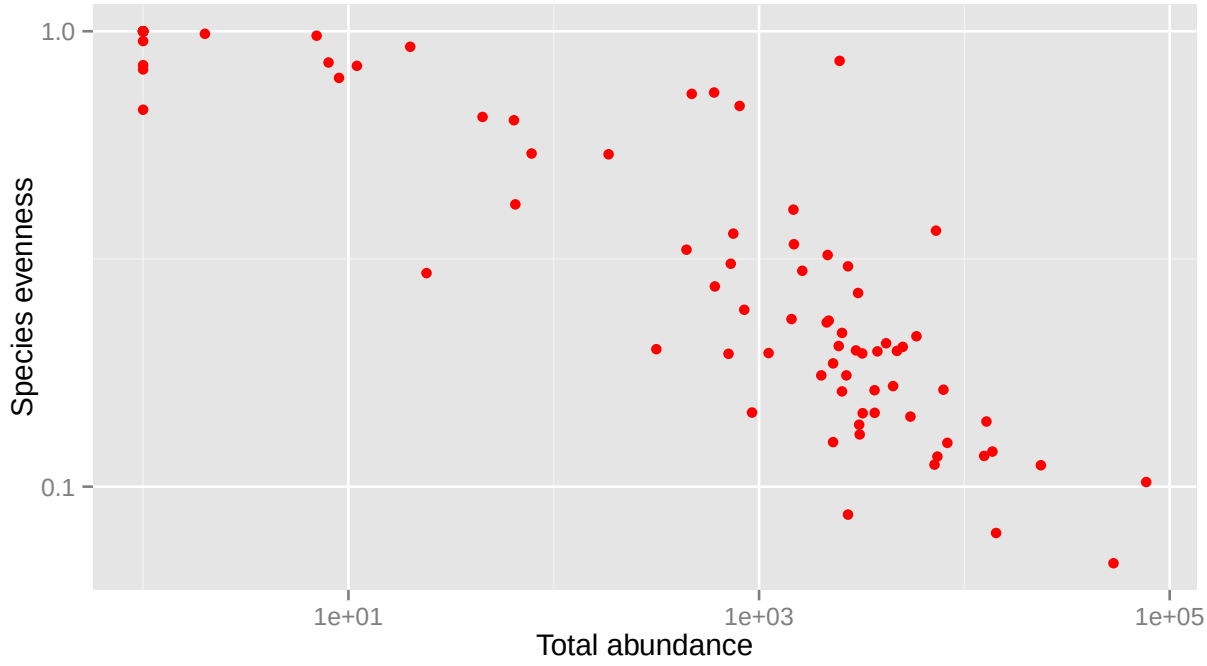
1.) How do species richness (S) and species evenness relate to total abundance (N)?

```
N <- dat$total.abundance[dat$total.abundance<=0] <- 1
S <- dat$species.richness[dat$species.richness<=0] <- 1

ggplot(dat, aes(x=dat$total.abundance, y=dat$species.richness)) +
  geom_point(colour="blue") +
  scale_x_log10() +
```

```
  scale_y_log10() +
  labs(x= "Total abundance", y="Species richness")
```



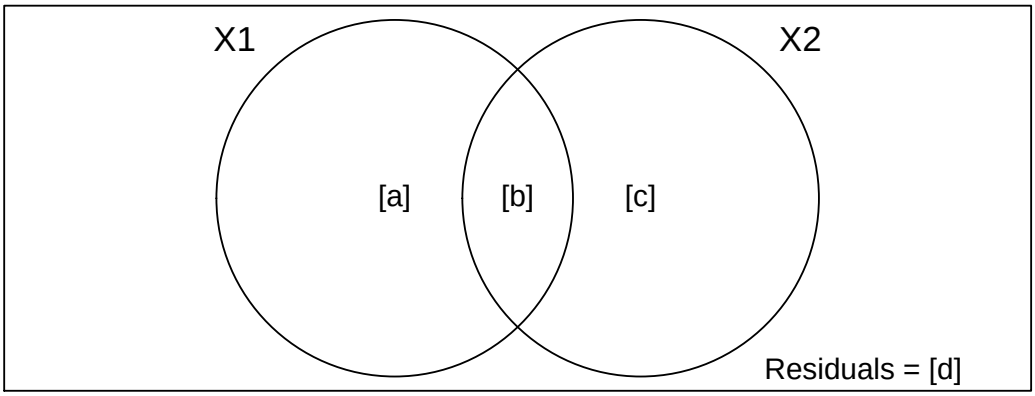

```
ggplot(dat, aes(x=dat$total.abundance, y=dat$e.var)) +
  geom_point(colour="red") +
  scale_x_log10() +
  scale_y_log10() +
  labs(x= "Total abundance", y="Species evenness")
```



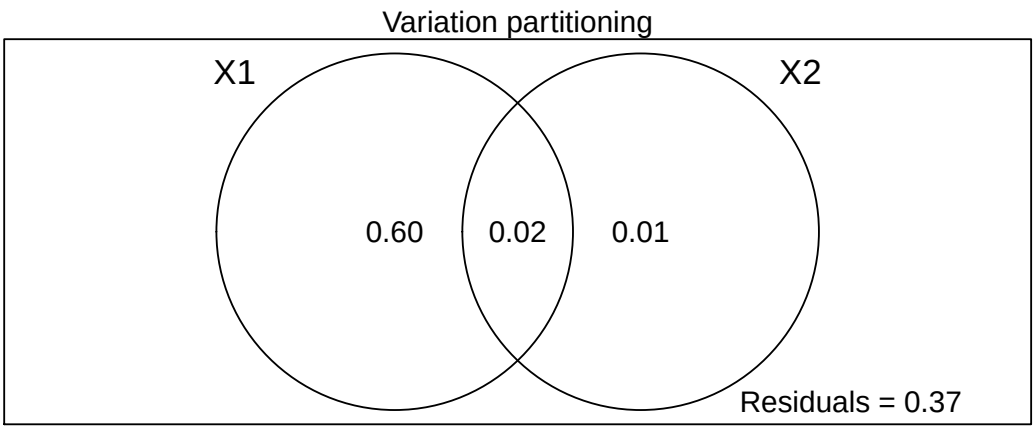
2.) Variance partitioning

```
plot.new()
dat[is.na(dat)] <- 0
dat$h.tau <- (dat$height * dat$width)/dat$flow.rate

# Physical and metacommunity variables
phys.dat <- as.matrix(subset(dat, select = c(avg.per.capita.growth,
              avg.per.capita.maint,
              avg.per.capita.N.efficiency,
              avg.per.capita.P.efficiency,
              avg.per.capita.C.efficiency)))

# Resource variables
res.dat <- as.matrix(subset(dat,
              select = c(resource.concentration,
              shannons.resource.diversity,
              resource.richness,
              resource.particles)))

y.dat <- as.matrix(subset(dat,
              select = c(total.abundance,
              species.richness,
              simpson.e,
              Whittakers.turnover)))

rda.phys <- rda(y.dat ~ phys.dat)
#rda.phys
rda.res <- rda(y.dat ~ res.dat)
```

```
#rda.res

# Two explanatory matrices -- Hellinger-transform Y
mod <- varpart(Y=y.dat, X=phys.dat, res.dat,  transfo="log")
mod
showvarparts(2)
```




```
plot(mod)
mtext("Variation partitioning")
```




```
#text(1.6, 0.6, "env")
#text(-0.6, 0.6, "tau")

# Test fraction using RDA:
phys.anova <- anova(rda.phys, step=200, perm.max=200)
phys.anova

res.anova <- anova(rda.res, step=200, perm.max=200)
res.anova
```