Timing Data Recursive

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```
# Libraries
library(tidyverse)
```

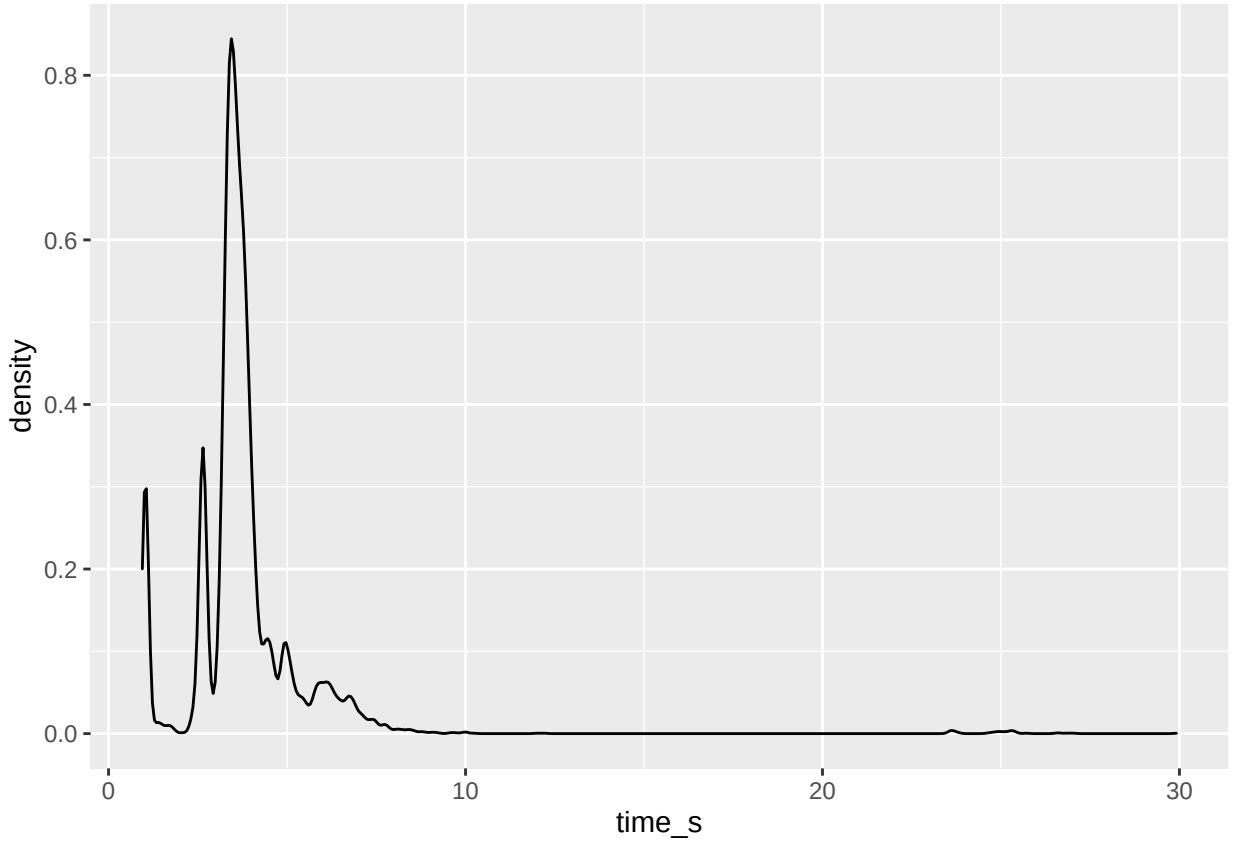
To make time_modes.csv I took data from 3 full log files on 021 (ABBA, ~31G each)

```
timing <- read.csv("~/Desktop/time_modes_recursive.csv") %>%
  group_by(mode) %>%
  mutate(appearances = n()) %>%
  ungroup %>%
  arrange(-appearances) %>%
  mutate(rank = dense_rank(-appearances))
timing %>% glimpse
```

```
## Rows: 9,940
## Columns: 4
## $ mode        <chr> "31dab41", "31dab41", "31dab41", "31dab41", "31dab41", ...
## $ time_s      <dbl> 3.242231, 3.548131, 3.358223, 3.258863, 4.580467, 3.451...
## $ appearances <int> 3527, 3527, 3527, 3527, 3527, 3527, 3527, 3527, 3527, 3...
## $ rank        <int> 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1...
```

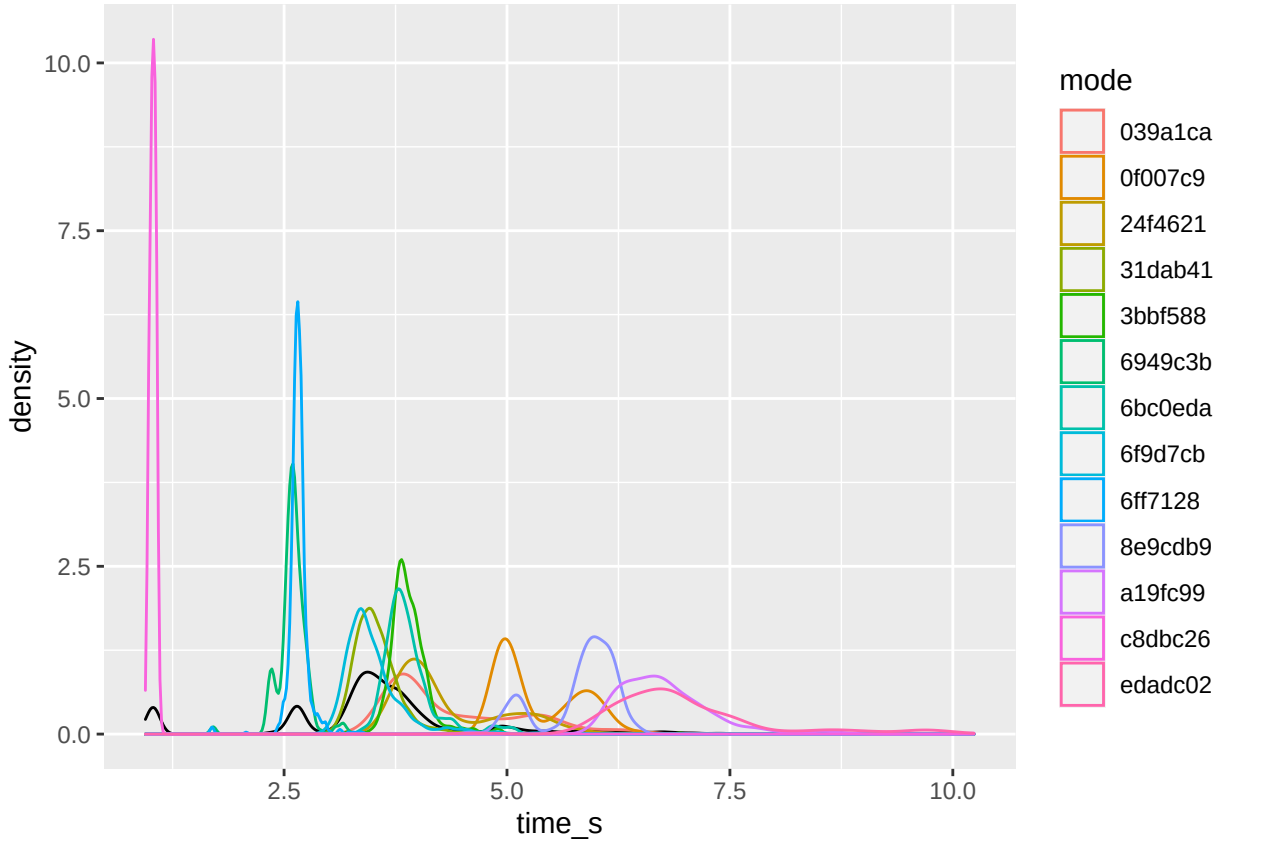
Here is what the mixture density looks like, very multi-modal.

```
timing %>%
  ggplot +
  geom_density(aes(x = time_s))
```



Here are modes with over 100 observations, you can see how spread they are as well as how a few overlap. Remember that since densities integrate to 1 the height just means that it's a very narrow density, it doesn't indicate the number of samples.

```
timing %>%
  filter(appearances > 100) %>%
  ggplot +
  geom_density(aes(x = time_s)) +
  geom_density(aes(x = time_s, color = mode))
```



Here we can see the shape of the density for the top 12 modes (note that X and Y scales are both free in order to better view the shape). I would say 9/12 are approximately normal.

```
timing %>%
  filter(rank <= 12) %>%
  ggplot +
  geom_density(aes(x = time_s, color = mode)) +
  facet_wrap(~ appearances + mode, scales = "free") +
  scale_x_continuous(breaks = waiver(), n.breaks = 2)
```