Sufficient sample sizes

Derumigny, A. , Guyonvarch Y. & Girard, L.

May 12, 2023

```
alpha = 0.05
K4 = 9
kappa = 0.99
```

Computation of power

```
n = c(200, 500, 800,
      1000, 2000, 5000, 10000, 50000, 100000)
eta = c(0.01, 0.02, 0.05, 0.1, 0.2, 0.5)

df = expand.grid(n = n, eta = eta)
df$beta = Gauss_test_powerAnalysis(eta = df$eta, n = df$n, alpha = alpha,
                                   K4 = K4, kappa = kappa)
```

```
my_table = df %>%
  mutate(
    eta = paste0("eta = ", eta),
    beta = formatC(if_else(beta < 0, 0, beta * 100) ,
                   digits = 1, format = "f"),
    n = formatC(n, big.mark = ",", format = "d")) %>%
  pivot_wider(names_from = "eta", values_from = "beta") %>%
  gt::gt()

my_table
```

n	eta = 0.01	eta = 0.02	eta = 0.05	eta = 0.1	eta = 0.2	eta = 0.5
200	0.0	0.0	0.0	0.0	15.8	27.3
500	0.0	0.0	7.4	49.9	78.0	78.1
800	0.0	0.0	25.3	73.5	85.1	85.1
1,000	0.0	2.8	34.0	81.0	87.2	87.2
2,000	3.5	14.3	63.9	91.7	91.8	91.8
5,000	13.1	36.3	92.9	95.7	95.7	95.7
10,000	23.3	61.2	97.4	97.5	97.5	97.5
50,000	71.7	99.2	99.5	99.5	99.5	99.5
100,000	93.3	99.8	99.8	99.8	99.8	99.8

```
my_table %>% gt::as_latex() %>% cat()
```

```
## \begin{longtable}{rrrrrrr}
## \toprule
```

```
## n & eta = 0.01 & eta = 0.02 & eta = 0.05 & eta = 0.1 & eta = 0.2 & eta = 0.5 \\
## \midrule
## 200 & 0.0 & 0.0 & 0.0 & 0.0 & 15.8 & 27.3 \\
## 500 & 0.0 & 0.0 & 7.4 & 49.9 & 78.0 & 78.1 \\
## 800 & 0.0 & 0.0 & 25.3 & 73.5 & 85.1 & 85.1 \\
## 1,000 & 0.0 & 2.8 & 34.0 & 81.0 & 87.2 & 87.2 \\
## 2,000 & 3.5 & 14.3 & 63.9 & 91.7 & 91.8 & 91.8 \\
## 5,000 & 13.1 & 36.3 & 92.9 & 95.7 & 95.7 & 95.7 \\
## 10,000 & 23.3 & 61.2 & 97.4 & 97.5 & 97.5 & 97.5 \\
## 50,000 & 71.7 & 99.2 & 99.5 & 99.5 & 99.5 & 99.5 \\
## 100,000 & 93.3 & 99.8 & 99.8 & 99.8 & 99.8 & 99.8 \\
## \bottomrule
## \end{longtable}
```

Computation of sufficient sample sizes

```
eta = c(0.01, 0.02, 0.05, 0.1, 0.2, 0.5)
beta = c(0.5, 0.8, 0.85, 0.9, 0.95, 0.99)

df2 = expand.grid(eta = eta, beta = beta)
df2$n_suffi = NA

for (i in 1:nrow(df2)){
  df2$n_suffi[i] = Gauss_test_powerAnalysis(eta = df2$eta[i], beta = df2$beta[i], alpha = alpha,
                                            K4 = K4, kappa = kappa)
}

my_table
```

n	eta = 0.01	eta = 0.02	eta = 0.05	eta = 0.1	eta = 0.2	eta = 0.5
200	0.0	0.0	0.0	0.0	15.8	27.3
500	0.0	0.0	7.4	49.9	78.0	78.1
800	0.0	0.0	25.3	73.5	85.1	85.1
1,000	0.0	2.8	34.0	81.0	87.2	87.2
2,000	3.5	14.3	63.9	91.7	91.8	91.8
5,000	13.1	36.3	92.9	95.7	95.7	95.7
10,000	23.3	61.2	97.4	97.5	97.5	97.5
50,000	71.7	99.2	99.5	99.5	99.5	99.5
100,000	93.3	99.8	99.8	99.8	99.8	99.8

```
my_table = df2 %>%
  mutate(n_suffi = formatC(n_suffi, big.mark = ",", format = "d")) %>%
  pivot_wider(names_from = "eta", values_from = "n_suffi") %>%
  gt::gt() %>% gt::as_latex() %>% cat
```

```
## \begin{longtable}{rrrrrrr}
## \toprule
## beta & 0.01 & 0.02 & 0.05 & 0.1 & 0.2 & 0.5 \\
## \midrule
## 0.50 & 27,993 & 7,489 & 1,463 & 501 & 280 & 265 \\
## 0.80 & 62,597 & 16,237 & 2,988 & 967 & 549 & 548 \\
## 0.85 & 72,686 & 18,841 & 3,490 & 1,176 & 789 & 789 \\
```

```
## 0.90 & 86,507 & 22,462 & 4,255 & 1,636 & 1,469 & 1,469 \\
## 0.95 & 109,374 & 28,665 & 5,976 & 4,070 & 4,070 & 4,070 \\
## 0.99 & 161,151 & 45,735 & 27,946 & 27,946 & 27,946 & 27,946 \\
## \bottomrule
## \end{longtable}
```