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1: > #This script was used to do the problems on
2: > #   a particular worksheet12
3: > #####
4: > ## C A S E:  1  ##
5: > #####
6: > n_1 <- 26      # set the sample size for the numerator
7: > s_1 <- 12.48   # Standard deviation of sample for numerator
8: > n_2 <- 38      # set the sample size for the denominator
9: > s_2 <- 11.25   # Standard deviation of sample for denominator
10: > ci_level <- 0.88 # set the confidence level
11: > #
12: > # We could do this the long way
13: > #
14: > df_num <- n_1 - 1;
15: > df_den <- n_2 - 1;
16: > c(df_num,df_den);
17: [1] 25 37
18: > #
19: > alpha <- (1-ci_level)/2 # desired area on left and right
20: > alpha
21: [1] 0.06
22: > quotient =s_1^2/(s_2^2) # get the quotient of the variances
23: > quotient
24: [1] 1.23062
25: > #
26: > f_left <- qf( alpha, df_num, df_den)
27: > f_left
28: [1] 0.549991
29: > f_right <- qf( alpha, df_num, df_den, lower.tail=FALSE)
30: > f_right
31: [1] 1.74825
32: > #
33: > ci_left <- quotient/f_right
34: > ci_right <- quotient/f_left
35: > ci_left
36: [1] 0.7039155
37: > ci_right
38: [1] 2.237528
39: > #
40: > # or we could do this the simple way
41: > #
42: > source("../ci_2popvar.R")
43: > ci_2popvar(n_1,s_1, n_2, s_2, ci_level )
44:      CI Low      CI_HIGH      Quotient      F Low      F High
45:  0.7039155  2.2375283  1.2306204  0.5499910  1.7482503
46:  Top Var.      Top sd      Top size      Bot Var.      Bot sd
47: 155.7504000  12.4800000  26.0000000  126.5625000  11.2500000
48:  Bot size      C level      Alpha/2
49: 38.0000000  0.8800000  0.0600000
50: > #
51: > #####
52: > ## C A S E:  2  ##
53: > #####
54: > n_1 <- 41      # set the sample size for the numerator
55: > s_1 <- 24.06   # Standard deviation of sample for numerator
56: > n_2 <- 34      # set the sample size for the denominator
57: > s_2 <- 22.53   # Standard deviation of sample for denominator
58: > ci_level <- 0.85 # set the confidence level
59: > #
60: > ci_2popvar(n_1,s_1, n_2, s_2, ci_level )

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61:      CI Low      CI_HIGH      Quotient      F Low      F High
62: 0.6974092  1.8376632  1.1404306  0.6205874  1.6352388
63:   Top Var.      Top sd      Top size      Bot Var.      Bot sd
64: 578.8836000  24.0600000  41.0000000  507.6009000  22.5300000
65:   Bot size      C level      Alpha/2
66: 34.0000000  0.8500000  0.0750000
67: > #
68: > #####
69: > ## C A S E:  3  ##
70: > #####
71: > n_1 <- 23      # set the sample size for the numerator
72: > s_1 <- 45.39   # Standard deviation of sample for numerator
73: > n_2 <- 45      # set the sample size for the denominator
74: > s_2 <- 42.98   # Standard deviation of sample for denominator
75: > ci_level <- 0.985 # set the confidence level
76: > #
77: > ci_2popvar(n_1,s_1, n_2, s_2, ci_level )
78:      CI Low      CI_HIGH      Quotient      F Low
79: 0.4716906  2.9878621  1.1152893  0.3732734
80:      F High      Top Var.      Top sd      Top size
81: 2.3644511  2060.2521000  45.3900000  23.0000000
82:      Bot Var.      Bot sd      Bot size      C level
83: 1847.2804000  42.9800000  45.0000000  0.9850000
84:      Alpha/2
85: 0.0075000
86: > #
87: > #####
88: > ## C A S E:  4  ##
89: > #####
90: > n_1 <- 27      # set the sample size for the numerator
91: > s_1 <- 16.32   # Standard deviation of sample for numerator
92: > n_2 <- 31      # set the sample size for the denominator
93: > s_2 <- 9.931   # Standard deviation of sample for denominator
94: > alpha <- 0.01 # set the level of significance
95: > h_type <- 1    # set the type of the test
96: > #
97: > # we can do this the long way
98: > df_n <- n_1 - 1
99: > df_d <- n_2 - 1
100: > c(df_n,df_d)
101: [1] 26 30
102: > v_1 <- s_1^2   # get the variance of the first sample
103: > v_1
104: [1] 266.3424
105: > v_2 <- s_2^2   # get the variance of the second sample
106: > v_2
107: [1] 98.62476
108: > quotient <- v_1/v_2 # get the ratio
109: > quotient
110: [1] 2.700563
111: > use_alpha <- alpha
112: > if( h_type == 0 )
113: + { use_alpha <- alpha/2}
114: > # find the critical F values
115: > F_left <- qf( use_alpha, df_n, df_d)
116: > F_right <- qf( use_alpha, df_n, df_d, lower.tail=FALSE)
117: > F_left
118: [1] 0.3995806
119: > F_right
120: [1] 2.437425

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121: > # or look at the attained significance
122: > if( h_type == -1 )
123: + { pf( quotient, df_n, df_d ) } #area to left
124: > if( h_type == 1)
125: + { pf( quotient, df_n, df_d, lower.tail=FALSE) } #are to right
126: [1] 0.004851294
127: > if( h_type == 0)
128: + { # this is a type 0
129: +   if( quotient < 1)
130: +   { pf( quotient, df_n, df_d )*2} # need to double for two tails
131: +   else
132: +   { # need to double to account for the two tails
133: +     pf( quotient, df_n, df_d, lower.tail=FALSE)*2
134: +   }
135: + }
136: >
137: > #or we can use the simple approach
138: > source("../hypo_2var.R")
139: > hypoth_2test_var(n_1,s_1, n_2, s_2, h_type, alpha )
140:           H1                n top
141:       "v_1 > v_2"          "27"
142:           s top            v top
143:       "16.32"              "266.3424"
144:           n bot            s bot
145:       "31"                  "9.931"
146:           v bot            quotient
147:       "98.624761"          "2.70056319832299"
148:       crit low              crit high
149:       "n.a."                "2.43742466762021"
150:       decision              attained
151:       "Reject" "0.0048512944386742"
152: > #
153: > #####
154: > ## C A S E:  5  ##
155: > #####
156: > n_1 <- 53          # set the sample size for the numerator
157: > s_1 <- 23.81      # Standard deviation of sample for numerator
158: > n_2 <- 30         # set the sample size for the denominator
159: > s_2 <- 31.615    # Standard deviation of sample for denominator
160: > alpha <- 0.0175  # set the level of significance
161: > h_type <- -1     # set the type of the test
162: > #
163: > # we can use the simple approach
164: > #
165: > hypoth_2test_var(n_1,s_1, n_2, s_2, h_type, alpha )
166:           H1                n top
167:       "v_1 < v_2"          "53"
168:           s top            v top
169:       "23.81"              "566.9161"
170:           n bot            s bot
171:       "30"                  "31.615"
172:           v bot            quotient
173:       "999.508225"          "0.567195032337028"
174:       crit low              crit high
175:       "0.511888022934923"  "n.a."
176:       decision              attained
177:       "do not reject" "0.0370508047263761"
178: > #
179: > #####
180: > ## C A S E:  6  ##

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181: > #####
182: > n_1 <- 23      # set the sample size for the numerator
183: > s_1 <- 13.90   # Standard deviation of sample for numerator
184: > n_2 <- 32      # set the sample size for the denominator
185: > s_2 <- 9.865   # Standard deviation of sample for denominator
186: > alpha <- 0.0625 # set the level of significance
187: > h_type <- 0    # set the type of the test
188: > #
189: > # we can use the simple approach
190: > #
191: > hypoth_2test_var(n_1,s_1, n_2, s_2, h_type, alpha )
192:           H1                n top
193:     "v_1 != v_2"           "23"
194:           s top                v top
195:     "13.9"                 "193.21"
196:           n bot                s bot
197:     "32"                   "9.865"
198:           v bot                quotient
199:     "97.318225"           "1.98534241659258"
200:           crit low             crit high
201:     "0.460588173823856"   "2.06550024142697"
202:           decision             attained
203:     "do not reject"       "0.0780088982401659"
204: > #
205: > #####
206: > ## C A S E:  7  ##
207: > #####
208: > n_1 <- 17      # set the sample size for the numerator
209: > s_1 <- 20.05   # Standard deviation of sample for numerator
210: > n_2 <- 22      # set the sample size for the denominator
211: > s_2 <- 13.179  # Standard deviation of sample for denominator
212: > alpha <- 0.0875 # set the level of significance
213: > h_type <- 0    # set the type of the test
214: > #
215: > # we can use the simple approach
216: > #
217: > hypoth_2test_var(n_1,s_1, n_2, s_2, h_type, alpha )
218:           H1                n top
219:     "v_1 != v_2"           "17"
220:           s top                v top
221:     "20.05"                 "402.0025"
222:           n bot                s bot
223:     "22"                   "13.179"
224:           v bot                quotient
225:     "173.686041"           "2.31453545538527"
226:           crit low             crit high
227:     "0.427417605839476"   "2.22295877782628"
228:           decision             attained
229:     "Reject"               "0.0729347789694876"
230: > #
231: > #####
232: > ## C A S E:  8  ##
233: > #####
234: > n_1 <- 22      # set the sample size for the numerator
235: > s_1 <- 13.179  # Standard deviation of sample for numerator
236: > n_2 <- 17      # set the sample size for the denominator
237: > s_2 <- 8.444   # Standard deviation of sample for denominator
238: > alpha <- 0.0875 # set the level of significance
239: > h_type <- 0    # set the type of the test
240: > #
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241: > # we can use the simple approach
242: > #
243: > hypoth_2test_var(n_1,s_1, n_2, s_2, h_type, alpha )
244:           H1                n top
245:     "v_1 != v_2"           "22"
246:           s top                v top
247:     "13.179"                "173.686041"
248:           n bot                s bot
249:     "17"                     "8.444"
250:           v bot                quotient
251:     "71.301136"             "2.43595054362107"
252:           crit low             crit high
253:     "0.449850896910401"     "2.33963221528026"
254:           decision             attained
255:     "Reject" "0.0739325582328809"
256: >
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