

analysis-I

May 14, 2021

```
[1]: from permute.utils import hypergeom_conf_interval
     from cibus.utils import *
```

1 Data from Regeneron Press

```
[3]: n, m = 753, 752
     N = n+m
     n01, n11 = 59, 11
     n00 = m - n01
     n10 = n - n11
     alpha = 0.05
     n11, n10, n01, n00
```

```
[3]: (11, 742, 59, 693)
```

1.1 One-sided confidence intervals

1.1.1 Upper one-sided

```
[5]: N_dot_1 = hypergeom_conf_interval(n11*N/n, n11, N, 1-alpha/2,
    ↪alternative='upper')
     N_1_dot = hypergeom_conf_interval(n01*N/m, n01, N, 1-alpha/2,
    ↪alternative='lower')

     upper = (N_dot_1[1] - N_1_dot[0])/N

     ci = [-0.5, upper]
     ci
```

```
[5]: [-0.5, 0.306312292358804]
```

1.1.2 Lower one-sided

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[6]: N_dot_1 = hypergeom_conf_interval(n11*N/n, n11, N, 1-alpha/2,
    ↪alternative='lower')
```

```

N_1_dot = hypergeom_conf_interval(n01*N/m, n01, N, 1-alpha/2,
↳alternative='upper')

lower = (N_dot_1[0] - N_1_dot[1])/N

ci = [lower, 0.5]
ci

```

[6]: [-0.30498338870431896, 0.5]

1.1.3 Two-sided

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[15]: N_dot_1 = hypergeom_conf_interval(n11*N/n, n11, N, 1-alpha,
↳alternative='two-sided')
N_1_dot = hypergeom_conf_interval(n01*N/m, n01, N, 1-alpha,
↳alternative='two-sided')
lower = (N_dot_1[0] - N_1_dot[1])/N
upper = (N_dot_1[1] - N_1_dot[0])/N
ci = [lower, upper]
ci

```

[15]: [-0.30498338870431896, 0.306312292358804]

[16]: tau_twosided_ci(n11, n10, n01, n00, 0.05, False, 10**3, 10)

```

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IndexError                                Traceback (most recent call last)
<ipython-input-16-dfc7efdd03c6> in <module>
----> 1 tau_twosided_ci(n11, n10, n01, n00, 0.05, False, 10**3, 10)

~/Desktop/hw8/homework-8-group-6-1/cibin/utils.py in tau_twosided_ci(n11, n10,
↳n01, n00, alpha, exact, max_combinations, reps)
    597     m = n11+n10
    598     if m > (n/2):
--> 599         ci = tau_twoside_less_treated(n11, n10, n01, n00, alpha, exact,
                                           max_combinations, reps)
    600
    601     tau_lower = -ci[1]

~/Desktop/hw8/homework-8-group-6-1/cibin/utils.py in
↳tau_twoside_less_treated(n11, n10, n01, n00, alpha, exact, max_combinations,
↳reps)
    542         Z_all = combs(n, m, reps)
    543         ci_lower = tau_twoside_lower(n11, n10, n01, n00, alpha, Z_all,
↳exact, reps)
--> 544         ci_upper = tau_twoside_lower(n10, n11, n00, n01, alpha, Z_all,
↳exact, reps)

```

```

545     rand_test_total = ci_lower[4] + ci_upper[4]
546     tau_lower = min(ci_lower[0], -1*ci_upper[2])

~/Desktop/hw8/homework-8-group-6-1/cibin/utils.py in tau_twoside_lower(n11, n10,
↳ n01, n00, alpha, Z_all, exact, reps)
    471     rand_test_total = 0
    472     for N11 in np.arange(int(min(n11+n01, n+ntau_obs))+1):
--> 473         tau_min_N11 = tau_lower_N11_twoside(n11, n10, n01, n00, N11,
↳ Z_all,
    474                                     alpha)
    475         rand_test_total = rand_test_total + tau_min_N11[4]

~/Desktop/hw8/homework-8-group-6-1/cibin/utils.py in tau_lower_N11_twoside(n11,
↳ n10, n01, n00, N11, Z_all, alpha)
    412     accept_pos = np.flatnonzero(N10_vec[compat]-N01_vec[compat] ==
    413                                 n*tau_max)
--> 414     accept_pos = accept_pos[0]
    415     N_accept_max = np.array([N11, N10_vec[compat][accept_pos],
    416                             N01_vec[compat][accept_pos],

```

IndexError: index 0 is out of bounds for axis 0 with size 0