

Release Notes

Highlights:

- Documentation improvements
- Added ability to choose between 3 computation methods for binomial and hypergeometric confidence intervals: Sterne, Clopper-Pearson, Wang
- Added more extensive testing

Description of problems and gaps found in the unit tests

1) Need unit tests on checking the effectiveness of the input.

- For 'binom_conf_interval', we need to check if the number of successes is no larger than the population size and it can not be a negative value.
- For 'hypergeom_conf_interval' functions, we need to restrict that the observed good elements can not exceed the sample size, and the number of successes is no larger than the population size, and population size cannot be smaller than sample size, and the observed good elements can not exceed the population size.

Description of each of the new tests and the functionality it tests

1) Test(s) for 1-sided bound for hypergeom_conf_interval and binom_conf_interval

- Checked whether actual p/G falls in the calculated confidence interval.

2) Test(s) for 2-sided bound for hypergeom_conf_interval and binom_conf_interval

- Checked whether actual p/G falls in the calculated confidence interval.

3) Test(s) to check the effectiveness of the inputs in binom_conf_interval

- all the `test_binom_conf_badinput()` functions test raise `ValueError` when there are bad inputs. Including:
 - 1) Observed successes cannot be larger than sample size.
 - 2) Observed successes cannot be negative
 - 3) With current implementation, Sterne can only be used with two-sided CI

4) Test(s) to check the effectiveness of the inputs in hypergeom_conf_interval

- all the `test_hypergeometric_conf_badinput()` functions test raise `ValueError` when there are bad inputs. Including:
 - 1) Observed successes cannot be larger than sample size
 - 2) Population size cannot be smaller than size of sample taken w/o replacement
 - 3) Number of observed successes cannot be larger than size of population
 - 4) Number of observed successes cannot be negative

5) Test(s) for binom_conf_interval when method is clopper-pearson

`test_binom_conf_interval1()`:

- Tests legal calls to `binom_conf_interval`, using the Clopper-pearson computation method.
- Asserts proper bounds are returned for both one-sided and two-sided.
- `test_binom_conf_badinput1()` - `test_binom_conf_badinput2()`: check for bad inputs

6) Test(s) for binom_conf_interval when method is Sterne

`test_binom_conf_interval2()`:

- Tests legal calls to `binom_conf_interval`, using the Sterne computation method.
- Asserts proper bounds are returned for both one-sided and two-sided.
- `test_binom_conf_badinput3()` - `test_binom_conf_badinput5()`: check for bad inputs

5) Test(s) for hypergeom_conf_interval when method is clopper-pearson

`test_hypergeom_conf_interval1()`:

- Tests legal calls to `hypergeom_conf_interval`, using the default Clopper-Pearson computation method.
- Asserts proper bounds are returned for two-sided CI's.
- `test_hypergeometric_conf_badinput1()` - `test_hypergeometric_conf_badinput4()`: check for bad inputs

6) Test(s) for hypergeom_conf_interval when method is Sterne

`test_hypergeom_conf_interval2()`:

- Tests legal calls to `hypergeom_conf_interval`, using the Sterne computation method.

- Asserts proper bounds are returned for two-sided CI's.
- `test_hypergeometric_conf_badinput5() - test_hypergeometric_conf_badinput9()`: check for bad inputs

7) Test(s) for `hypergeom_conf_interval` when method is `wang`

`test_hypergeom_conf_interval3()`:

- Tests legal calls to `hypergeom_conf_interval`, using the Wang computation method.
- Asserts proper bounds are returned for two-sided CI's.
- `test_hypergeometric_conf_badinput10() - test_hypergeometric_conf_badinput14()`: check for bad inputs

Description of each of the new features

1) Add two methods for `binom_conf_interval`

- Users will be able to choose between method `clopper-pearson` and `sterne` when they calculated two-sided confidence intervals.

2) Add three methods for `hypergeom_conf_interval`

- Users will be able to choose between method `clopper-pearson`, `sterne` and `wang` when they calculated two-sided confidence intervals.

Author Contributions

Erich (Congo) Strange:

- Added unit tests for one-sided and two-sided methods.
- Checked whether the 2-sided bounds method correctly implements the mathematics.
- Checked whether the endpoints are found in a numerically stable and efficient manner in the 2-sided bounds method.
- Created compatibility for new methods in `binom_conf_interval` and `hypergeom_conf_interval`.
- Created new method `sterne` for `binom_conf_interval` and `hypergeom_conf_interval`.
- Added unit tests for `clopper-pearson` and `sterne`.
- Added discussion about the difference among three methods.

Jing Yuan:

- Checked whether one-sided bounds method correctly implements mathematics.
- Checked whether the endpoints are found in a numerically stable and efficient manner in the one-sided bounds method.
- Created new method `wang` for `hypergeom_conf_interval`.

- Added unit tests for **wang**.
- Calculated the expected width of the 2-sided 95% confidence intervals for `method=clopper-pearson` , `method=sterne`, and `method=wang`.
- Added discussion about the difference among three methods.
- Added recommendation about the difference among three methods.