Package 'mlbstats'

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Title Major League Baseball Player Statistics Calculator

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Description Computational functions for player metrics in major league baseball including batting, pitching, fielding, base-running, and overall player statistics. This package is actively maintained with new metrics being added as they are developed.

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R topics documented:

`ab_hr` *Calculates at bats per home run*

Description

Takes number of at bats and divides by number of home runs

Usage

```
ab_hr(ab, hr)
```

Arguments

`ab`	Number of at bats
`hr`	Number of home runs

Value

ab_hr

Examples

```
ab_hr(400, 25)
```

`aera` *Calculates adjusted earned run average (ERA+)*

Description

Computes adjusted earned run average accounting for park factor and league era (compare with "era" which is the traditional formula for earned run average, "erc" which is the component earned run average, or "dice" which is the defense-independent component earned run average)

Usage

```
aera(er, ip, lera, home_rs, home_ra, home_r, road_rs, road_ra, road_r)
```

Arguments

`er`	Number of runs that did not occur as a result of errors or passed balls
`ip`	Number of innings pitched
`lera`	Average league ERA
`home_rs`	Number of pitcher's team runs scored at home park
`home_ra`	Number of pitcher's team runs allowed at home park
`home_r`	Total number of runs scored at home park
`road_rs`	Number of pitcher's team runs scored at away park
`road_ra`	Number of pitcher's team runs allowed at away park
`road_r`	Total number of runs scored at away park

Value

aera

Examples

```
aera(10, 5.5, 2.5, 8, 7, 15, 6, 4, 10) # for a pair of games (one away, one home)
```

ba *Calculates batting average*

Description

Takes number of hits and divides by at bats. 1.000 (read “one-thousand" is perfect)

Usage

```
ba(h, ab)
```

Arguments

h	Number of hits
ab	Number of at bats

Value

ba

Examples

```
ba(200, 525)
```

baa *Calculates batting average against*

Description

Computes pitcher’s ability to prevent hits, based on h, bfp, bb, hbp, sf, sh, and ci (catcher’s interference)

Usage

```
baa(h, bfp, bb, hbp, sh, sf, ci)
```

Arguments

h	Number of hits allowed
bfp	Number of batters facing pitcher
bb	Number of bases on balls
hbp	Number of hit batters
sh	Number of sacrifice hits
sf	Number of sacrifice flies
ci	Number of catcher’s interference

Value

baa

Examples

```
baa(105, 250, 50, 15, 10, 5, 1)
```

`babip` *Calculates batting average on balls in play*

Description

Generates the frequency a batter reaches a base after putting the ball in play (normal around .300)

Usage

```
babip(h, hr, ab, k, sf)
```

Arguments

`h`	Number of hits
`hr`	Number of home runs
`ab`	Number of at bats
`k`	Number of strikeouts
`sf`	Number of sacrifice flies

Value

babip

Examples

```
babip(200, 25, 525, 55, 6)
```

bb9 *Calculates bases on balls per nine innings pitched (W/9)*

Description

Computes bases on balls (walks) per nine innings pitched

Usage

```
bb9(bb, ip)
```

Arguments

bb	Number of bases on balls
ip	Number of innings pitched

Value

bb9

Examples

```
bb9(35, 210)
```

bb_k *Calculates walk to strikeout ratio (batting)*

Description

Takes the number of bases on balls and divides by number of strikeouts (for pitching version, see "k_bb")

Usage

```
bb_k(bb, k)
```

Arguments

bb	Number of bases on balls
k	Number of strikeouts

Value

bb_k

Examples

```
bb_k(65, 125)
```

BsR — *Calculates the base runs estimator*

Description

Takes the number of hits, bases on balls, home runs, total bases, and at bats to compute the base runs estimator, which is similar to runs created

Usage

```
BsR(h, bb, hr, tb, ab)
```

Arguments

h	Number of hits
bb	Number of bases on balls
hr	Number of home runs
tb	Number of total bases (one for 1B, two for 2B, three for 3B, and four for HR)
ab	Number of at bats

Value

BsR

Examples

```
BsR(135, 22, 12, 155, 330)
```

dice — *Calculates defense-independent component earned run average*

Description

Computes earned run average from hits and walks (compare with "era" which is the traditional formula for earned run average, "aera" which is a pitcher's adjusted earned run average, or "erc" which is the component earned run average)

Usage

```
dice(bb, hbp, hr, k, ip)
```

Arguments

bb	Number of bases on balls
hbp	Number of hit batters
hr	Number of home runs
k	Number of strikeouts
ip	Number of innings pitched

Value

dice

Examples

```
dice(45, 10, 60, 130, 400)
```

EqA *Calculates equivalent average*

Description

Takes the number of hits, total bases, bases on balls, hits by pitch, stolen bases, sacrifice hits, sacrifice flies, at bats, and caught stealing to compute the base runs, which is a player's batting average absent park and league effects

Usage

```
EqA(h, tb, bb, hbp, sb, sh, sf, ab, cs)
```

Arguments

h	Number of hits
tb	Number of total bases (one for 1B, two for 2B, three for 3B, and four for HR)
bb	Number of bases on balls
hbp	Number of hits by pitch
sb	Number of stolen bases
sh	Number of sacrifice hits (typically bunts)
sf	Number of sacrifice flies
ab	Number of at bats
cs	Number of caught stealing

Value

EqA

Examples

```
EqA(135, 155, 22, 3, 15, 4, 2, 365, 1)
```

era *Calculates earned run average*

Description

Computes a pitcher's earned run average (compare with "erc" which is the component earned run average, "aera" which is a pitcher's adjusted earned run average, or "dice" which is the defense-independent component earned run average)

Usage

```
era(er, ip)
```

Arguments

er	Number of runs that did not occur as a result of errors or passed balls
ip	Number of innings pitched

Value

era

Examples

```
era(150, 400)
```

erc *Calculates component earned run average*

Description

Computes earned run average from hits and walks (compare with "era" which is the traditional formula for earned run average, "aera" which is a pitcher's adjusted earned run average, or "dice" which is the defense-independent component earned run average)

Usage

```
erc(h, bb, hbp, hr, ibb, bfp, ip)
```

Arguments

h	Number of hits allowed
bb	Number of bases on balls
hbp	Number of hit batters
hr	Number of home runs
ibb	Number of intentional bases on balls
bfp	Number of batters faced by pitcher
ip	Number of innings pitched

Value

erc

Examples

```
erc(110, 45, 10, 70, 5, 400, 215)
```

---

fip *Calculates fielding independent pitching*

Description

Computes pitching performance statistic similar to ERA, but based on factors within the pitcher's control (compare with "dice" which is the defense-independent component earned run average)

Usage

```
fip(hr, bb, k, ip)
```

Arguments

hr	Number of home runs
bb	Number of bases on balls
k	Number of strikeouts
ip	Number of innings pitched

Value

fip

Examples

```
fip(65, 50, 100, 175)
```

fp *Calculates fielding percentage*

Description

Computes the fielding percentage (aka, fielding average), which reflects the percentage of proper ball handling

Usage

```
fp(p, a, e)
```

Arguments

p	Number of putouts
a	Number of assists
e	Number of errors

Value

fp

Examples

```
fp(13, 4, 2)
```

go_ao *Calculates ground outs-fly outs ratio (GO/AO)*

Description

Takes the number of ground ball outs and divides by number of fly ball outs to compute the GO/AO ratio

Usage

```
go_ao(go, ao)
```

Arguments

go	Number of ground ball outs
ao	Number of fly ball outs

Value

go_ao

Examples

```
go_ao(150, 88)
```

---

gpa *Calculates gross production average*

Description

Computes the gross production average, which is 1.8 times on-base percentage (OBP) plus slugging percentage (SLG), divided by four

Usage

```
gpa(h, bb, hbp, ab, sf, b1, b2, b3, hr)
```

Arguments

h	Number of hits
bb	Number of bases on balls
hbp	Number of hits by pitch
ab	Number of at bats
sf	Number of sacrifice flies
b1	Number of singles
b2	Number of doubles
b3	Number of triples
hr	Number of home runs

Value

gpa

Examples

```
gpa(150, 40, 2, 400, 5, 100, 40, 3, 7)
```

h9 *Calculates hits per nine innings pitched (H/9IP)*

Description

Computes hits per nine innings pitched

Usage

```
h9(h, ip)
```

Arguments

h	Number of hits allowed
ip	Number of innings pitched

Value

h9

Examples

```
h9(150, 175)
```

iso *Calculates isolated power*

Description

Computes isolated power, which is a player's ability to obtain extra bases from a hit. The statistic subtracts a hitter's batting average from the slugging percentage, with the maximum ISO being 3.000.

Usage

```
iso(b1, b2, b3, hr, ab, h)
```

Arguments

b1	Number of singles
b2	Number of doubles
b3	Number of triples
hr	Number of home runs
ab	Number of at bats
h	Number of hits

Value

iso

Examples

```
iso(100, 40, 3, 7, 350, 150)
```

---

k9 *Calculates strikeouts per nine innings pitched (K/9)*

Description

Computes strikeouts per nine innings pitched

Usage

```
k9(k, ip)
```

Arguments

k	Number of strikeouts
ip	Number of innings pitched

Value

k9

Examples

```
k9(105, 175)
```

---

k_bb *Calculates strikeout to walk ratio (pitching)*

Description

Computes strikeouts to walk ratio, based on number of strikeouts and number of walks (for batting version, see "bb_k")

Usage

```
k_bb(k, bb)
```

Arguments

k	Number of strikeouts
bb	Number of bases on balls

Value

k_bb

Examples

```
k_bb(105, 40)
```

---

obp *Calculates on-base percentage*

Description

Computes the on-base percentage based on number of hits, bases on balls, hits by pitch, at bats, and sacrifice flies

Usage

```
obp(h, bb, hbp, ab, sf)
```

Arguments

h	Number of hits
bb	Number of bases on balls
hbp	Number of hits by pitch
ab	Number of at bats
sf	Number of sacrifice flies

Value

obp

Examples

```
obp(150, 40, 2, 400, 5)
```

ops *Calculates on-base plus slugging*

Description

Computes the on-base percentage plus slugging average (OPS) based on number of hits, bases on balls, hits by pitch, at bats, sacrifice flies, and total weighted bases (represented individually, as in SLG and GPA calculations)

Usage

```
ops(h, bb, hbp, ab, sf, b1, b2, b3, hr)
```

Arguments

h	Number of hits
bb	Number of bases on balls
hbp	Number of hits by pitch
ab	Number of at bats
sf	Number of sacrifice flies
b1	Number of singles
b2	Number of doubles
b3	Number of triples
hr	Number of home runs

Value

ops

Examples

```
ops(200, 18, 4, 401, 4, 50, 20, 3, 13)
```

pafa *Calculates park factor*

Description

Computes the runs a team scores at home versus away (it is often used in other metrics, e.g., adjusted era (ERA+) for pitchers; see "aera")

Usage

```
pafa(home_rs, home_ra, home_r, road_rs, road_ra, road_r)
```

Arguments

home_rs	Number of pitcher's team runs scored at home park
home_ra	Number of pitcher's team runs allowed at home park
home_r	Total number of runs scored at home park
road_rs	Number of pitcher's team runs scored at away park
road_ra	Number of pitcher's team runs allowed at away park
road_r	Total number of runs scored at away park

Value

pafa

Examples

```
pafa(5, 6, 11, 4, 8, 12) # for a pair of games (one home, one away)
```

---

pa_so *Calculates plate appearances per strikeout (PA/SO)*

Description

Computes the number of times a hitter strikes out in relation to their plate appearances

Usage

```
pa_so(pa, so)
```

Arguments

pa	Number of plate appearances
so	Number of strikeouts

Value

pa_so

Examples

```
pa_so(450, 120)
```

pfr *Calculates power finesse ratio*

Description

Computes pitcher's performance either by game or overall, based on k, bb, and ip

Usage

```
pfr(k, bb, ip)
```

Arguments

k	Number of strikeouts
bb	Number of bases on balls
ip	Number of innings pitched

Value

pfr

Examples

```
pfr(115, 30, 400)
```

ra *Calculates run average*

Description

Computes pitcher's run average based on number of runs allowed and innings pitched

Usage

```
ra(r, ip)
```

Arguments

r	Number of runs allowed
ip	Number of innings pitched

Value

ra

Examples

```
ra(75, 400)
```

rc *Calculates runs created*

Description

Computes the basic version of the estimated runs a hitter creates or contributes (see also "rc2" for the 'stolen base' iteration and "rc3" for the technical iteration of the rc statistic)

Usage

```
rc(h, bb, tb, ab)
```

Arguments

h	Number of hits
bb	Number of bases on balls
tb	Number of total bases (one for 1B, two for 2B, three for 3B, and four for HR)
ab	Number of at bats

Value

rc

Examples

```
rc(150, 35, 165, 400)
```

rc2 *Calculates runs created accounting for stolen bases*

Description

Computes the estimated runs a hitter creates or contributes, accounting for base stealing (see also "rc" for the basic iteration and "rc3" for the technical iteration of the rc statistic)

Usage

```
rc2(h, bb, tb, ab, cs, sb)
```

Arguments

h	Number of hits
bb	Number of bases on balls
tb	Number of total bases (one for 1B, two for 2B, three for 3B, and four for HR)
ab	Number of at bats
cs	Number of stolen bases caught
sb	Number of stolen bases

Value

rc2

Examples

```
rc2(150, 35, 165, 400, 7, 9)
```

`rc3` *Calculates runs created accounting for all offensive indicators*

Description

Computes the technical iteration of estimated runs a hitter creates or contributes accounting for virtually all offensive indicators (see also "rc" for the basic iteration and "rc2" for the 'stolen base' iteration of the rc statistic)

Usage

```
rc3(h, bb, ibb, tb, ab, cs, sb, hbp, gidp, sh, sf)
```

Arguments

`h`	Number of hits
`bb`	Number of bases on balls
`ibb`	Number of intentional bases on balls
`tb`	Number of total bases (one for 1B, two for 2B, three for 3B, and four for HR)
`ab`	Number of at bats
`cs`	Number of stolen bases caught
`sb`	Number of stolen bases
`hbp`	Number of hits by pitch
`gidp`	Number of grounded into double play
`sh`	Number of sacrifice hits
`sf`	Number of sacrifice flies

Value

rc3

Examples

```
rc3(150, 35, 3, 165, 400, 7, 9, 5, 1, 6, 2)
```

rfa *Calculates range factor*

Description

Computes the amount of the field covered by a player

Usage

```
rfa(p, a, ip)
```

Arguments

p	Number of putouts
a	Number of assists
ip	Number of innings played in a defensive position

Value

rfa

Examples

```
rfa(20, 5, 450)
```

risp *Calculates batting average with runners in scoring position*

Description

Computes batting average accounting for runners in scoring position

Usage

```
risp(hrisp, abrisp)
```

Arguments

hrisp	Number of hits with runners in scoring position (on either 2nd or 3rd base)
abrisp	Number of at bats with runners in scoring position (on either 2nd or 3rd base)

Value

risp

Examples

```
risp(35, 120)
```

rp *Calculates runs produced*

Description

Computes the number of runs contributed by a hitter, based on runs, runs batted in, and home runs

Usage

```
rp(r, rbi, hr)
```

Arguments

r	Number of runs
rbi	Number of runs batted in
hr	Number of home runs

Value

rp

Examples

```
rp(70, 41, 22)
```

sba *Calculates stolen base attempts*

Description

Computes total attempts to steal a base, by adding sb and cs

Usage

```
sba(sb, cs)
```

Arguments

sb	Number of stolen bases
cs	Number of caught stealing

Value

sba

Examples

```
sba(20, 4)
```

sbsr *Calculates stolen base success rate*

Description

Computes percentage of bases successfully stolen

Usage

```
sbsr(sb, cs)
```

Arguments

sb	Number of stolen bases
cs	Number of caught stealing

Value

sbsr

Examples

```
sbsr(20, 4)
```

slg *Calculates slugging percentage*

Description

Computes the slugging percentage (SLG), based on the weighted number of singles, doubles, triples, home runs, and at bats

Usage

```
slg(b1, b2, b3, hr, ab)
```

Arguments

b1	Number of singles
b2	Number of doubles
b3	Number of triples
hr	Number of home runs
ab	Number of at bats

Value

slg

Examples

```
slg(100, 40, 3, 7, 350)
```

`ta` *Calculates total average*

Description

Computes overall offensive contribution of a single player

Usage

```
ta(tb, hbp, bb, sb, ab, h, cs, gidp)
```

Arguments

`tb`	Number of total bases (one for 1B, two for 2B, three for 3B, and four for HR)
`hbp`	Number of hits by pitch
`bb`	Number of bases on balls
`sb`	Number of stolen bases
`ab`	Number of at bats
`h`	Number of hits
`cs`	Number of caught stealing
`gidp`	Number of grounded into double play

Value

ta

Examples

```
ta(125, 11, 40, 10, 400, 105, 2, 6)
```

tc *Calculates total chances*

Description

Computes the opportunities for defensive ball handling

Usage

```
tc(p, a, e)
```

Arguments

p	Number of putouts
a	Number of assists
e	Number of errors

Value

tc

Examples

```
tc(11, 5, 5)
```

tob *Calculates times on base*

Description

Computes total times a player reaches a base by adding h, hbp, and bb

Usage

```
tob(h, hbp, bb)
```

Arguments

h	Number of hits
hbp	Number of hits by pitch
bb	Number of bases on balls

Value

tob

Examples

```
tob(234, 6, 24)
```

`vorp` *Calculates value over replacement player (pitching)*

Description

Computes a pitcher's marginal utility

Usage

```
vorp(ip, lr, lg, r)
```

Arguments

`ip`	Number of innings pitched
`lr`	Number of league runs
`lg`	Number of league games played
`r`	Number of runs

Value

vorp

Examples

```
vorp(400, 98, 20, 110)
```

`whip` *Calculates walks plus hits per innings pitched (WHIP)*

Description

Computes walks plus hits per innings pitched, which reflects the number of baserunners allowed by a pitcher over a given period

Usage

```
whip(bb, h, ip)
```

Arguments

`bb`	Number of bases on balls
`h`	Number of hits allowed
`ip`	Number of innings pitched

Value

whip

Examples

```
whip(50, 110, 425)
```

`wr` *Calculates whiff rate*

Description

Computes pitcher's ability to get a batter to swing and miss pitches over any period of time (e.g., in a single game, single season, career, etc.)

Usage

```
wr(sw, tp)
```

Arguments

`sw`	Number of swings and misses
`tp`	Total pitches thrown

Value

wr

Examples

```
wr(300, 750)
```

`wra` *Calculates win ratio*

Description

Computes a team's win ratio, which is used in the so-called "Pythagorean expectation"

Usage

```
wra(rs, ra)
```

Arguments

`rs`	Number of runs scored
`ra`	Number of runs allowed

Value

wra

Examples

```
wra(400, 301)
```

---

xbh *Calculates extra base hits*

Description

Computes total hits by a player greater than singles (1B) by adding 2B, 3B, and hr

Usage

```
xbh(b2, b3, hr)
```

Arguments

b2	Number of doubles
b3	Number of triples
hr	Number of home runs

Value

xbh

Examples

```
xbh(20, 18, 4)
```

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