Solutions to One Equation One Unknown Problems

Fan Wang

2020-04-13

Contents

Linear Scalar f(x)=0 Solutions

Go to the **RMD**, **R**, **PDF**, or **HTML** version of this file. Go back to fan's REconTools Package, R Code Examples Repository (bookdown site), or Intro Stats with R Repository (bookdown site).

Ratio Here are some common ratios.

Unif Draw Min and Max Ratio We want to draw numbers such that we have some mean b, and that the possible maximum and minimum value drawn are at most a times apart. Given b and a, solve for x.

$$f(x) = \frac{b+x}{b-x} - a = 0$$

$$b \cdot a - x \cdot a = b + xb \cdot a - b = x + x \cdot ab\,(a-1) = x\,(a+1)\,x = \frac{b\,(a-1)}{a+1}$$

Uniformly draw

```
b <- 100
a <- 2
x <- (b*(a-1))/(a+1)
ar_unif_draws <- runif(100, min=b-x, max=b+x)
fl_max_min_ratio <- max(ar_unif_draws)/min(ar_unif_draws)
cat('fl_max_min_ratio =', fl_max_min_ratio, 'is close to a =', a, '\n')
```

```
## fl_max_min_ratio = 1.965882 is close to a = 2
```