### Autorius: Marius Arlauskas

### Variantas: 1

### 1 užduotis:

```
libname BIBL "/home/u62272156/lab1";
run;

PROC IMPORT OUT= bibl.test
 DATAFILE=
"/home/u62272156/lab1/uzduotis1.csv"
 DBMS=CSV REPLACE;
 SHEET="uzduotis1";
 GETNAMES=YES;
RUN;

DATA bibl.uzduotis1_REZ;
set bibl.test;
IF X_8/X_2<1 then
     do;
     naujas_1 = 0;
     end;
IF X_8/X_2>=1 then
     do;
     naujas_1 = 1;
     end;
IF naujas_1=0 then
     do;
     naujas_2 = 0.15 * X_5;
     end;
IF naujas_1=1 then
```

```
        do;

        naujas_2 = 0.85 * X_5;

        end;


proc print data = bibl.uzduotis1_REZ(obs = 10); run;
```

| Obs | X_1 | X_2 | X_3 | X_4 | X_5 | X_6 | X_7 | X_8 | X_9 | X_10 | naujas_1 | naujas_2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 8.8735461893 | 10.00940184 | 10.774440958 | 9.4589330204 | 8.813091183 | 11.134965089 | 8.5429642555 | 11.746881334 | 10.644194027 | 11.114085544 | 1 | 7.49113 |
| 2 | 9.6836433242 | 11.288873286 | 11.595654774 | 11.302424534 | 8.0739169874 | 11.111931845 | 12.023163653 | 10.378920972 | 10.312719837 | 10.981384629 | 0 | 1.21109 |
| 3 | 8.6643713876 | 11.186588433 | 9.0970026964 | 10.328307712 | 10.895281807 | 9.1292223664 | 8.2431703716 | 9.9174534084 | 9.4265498668 | 10.253276098 | 0 | 1.63429 |
| 4 | 11.095280802 | 9.2690921993 | 9.3091321793 | 10.342191355 | 9.8881382186 | 10.210731585 | 7.9938815644 | 9.4327012214 | 10.642800284 | 11.906981777 | 1 | 8.40492 |
| 5 | 9.8295077718 | 7.3147644647 | 9.2837779685 | 9.6633266443 | 9.3003716052 | 10.069395647 | 10.797648527 | 9.6235957598 | 10.122612246 | 10.120467357 | 1 | 7.90532 |
| 6 | 8.6795316159 | 12.09766159 | 9.3243425772 | 8.6632661467 | 9.7220520134 | 8.3373511472 | 11.007444408 | 9.28514416 | 11.221433255 | 12.427738733 | 0 | 1.45831 |
| 7 | 9.9874290524 | 10.267066167 | 9.3333690543 | 8.3033728456 | 9.4740186582 | 10.81083998 | 9.9040118011 | 10.569910961 | 10.600944402 | 9.2042598042 | 1 | 8.05292 |
| 8 | 10.238324705 | 10.141327336 | 9.4043225473 | 9.5766143564 | 10.896658776 | 8.087654204 | 9.893179512 | 8.7323156367 | 10.993386753 | 11.712317892 | 0 | 1.63450 |
| 9 | 10.075781352 | 9.5866004769 | 11.14182041 | 11.801719228 | 10.627660709 | 8.7532465712 | 10.82504317 | 8.4546380216 | 10.625471906 | 9.8759924872 | 0 | 1.59415 |
| 10 | 9.1946116128 | 10.110108423 | 9.0024617081 | 10.021703816 | 8.1733694041 | 10.998154445 | 11.498718955 | 9.5326181961 | 10.708051023 | 10.754249509 | 0 | 1.22601 |

▦ uzduotis1_rez.sas7bdat

## 2 užduotis:

| Basic Confidence Limits Assuming Normality | | |
|---|---|---|
| Parameter | Estimate | 88% Confidence Limits |
| Mean | 10.22945 | 10.11384 | 10.34505 |
| Std Deviation | 1.04703 | 0.97197 | 1.13628 |
| Variance | 1.09628 | 0.94473 | 1.29114 |

```
proc univariate data=bibl.test alpha=0.12 cibasic;

VAR X_8;

run;
```

komentaras:

Esame užtikrinti 88%, kad tikrasis populiacijos vidurkis yra intervale [10.11384;10.34505].

## 3 užduotis:

```
/*perform Kolmogorov-Smirnov test*/

proc univariate data=bibl.test;

   histogram X_8 / normal(mu=est sigma=est);
```

```
run;
```

| Goodness-of-Fit Tests for Normal Distribution | | | | |
|---|---|---|---|---|
| Test | Statistic | | p Value | |
| Kolmogorov-Smirnov | D | 0.03736633 | Pr > D | >0.150 |
| Cramer-von Mises | W-Sq | 0.04113696 | Pr > W-Sq | >0.250 |
| Anderson-Darling | A-Sq | 0.32532918 | Pr > A-Sq | >0.250 |

Komentaras:

Testo gauta p reikšmė yra 0.15, kadangi ji yra didesnė nei nustatytas reikšmingumo lygmuo, hipotezė, kad skirstinys yra pasiskirstęs pagal normalųjį skirstinį yra priimtina.

## 4 uzduotis:

```
PROC IMPORT OUT= bibl.test_2

 DATAFILE=

"/home/u62272156/lab1/uzduotis2.csv"

 DBMS=CSV REPLACE;

 SHEET="uzduotis2";

 GETNAMES=YES;

RUN;


proc univariate data=bibl.test_2 mu0=10 alpha=0.05;

VAR X_8;

run;
```

| Tests for Location: Mu0=10 | | | | |
|---|---|---|---|---|
| Test | Statistic | | p Value | |
| Student's t | t | -0.39775 | Pr > \|t\| | 0.6925 |
| Sign | M | -2 | Pr >= \|M\| | 0.6718 |
| Signed Rank | S | -27.5 | Pr >= \|S\| | 0.7937 |

Komentaras:

Naudojau stjudento t testą, kadangi imties vidurkis ir mediana beveik sutampa, dariau prielaidą, kad skirstinys yra normalusis. Kadangi p reikšmė yra didesnė už 0.05, hipotezė kad miu=10 yra priimtina.

## 5 uzduotis:

```
PROC IMPORT OUT= bibl.test_3
 DATAFILE=
"/home/u62272156/lab1/uzduotis3.csv"
 DBMS=CSV REPLACE;
 SHEET="uzduotis3";
 GETNAMES=YES;
RUN;



PROC TTEST data =bibl.test_3;
    CLASS X_group;
    VAR X_8;
  RUN;
```

| Method | Variances | DF | t Value | Pr > |t| |
|--------|-----------|------|---------|---------|
| Pooled | Equal | 98 | 0.91 | 0.3649 |
| Satterthwaite | Unequal | 79.898 | 0.91 | 0.3654 |

Komentaras:

Kadangi abidvi p reikšmės didesnės už 0.05 mums nebėra svarbi prielaida apie dispersijų(variances) lygumą, kadangi bet kuriuo atveju, hipotezė apie imčių vidurkiu lygybę yra priimtina.