

# FF\_DISC\_RAND\_VAR\_STATS Examples

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This is the example vignette for function: `ff_disc_rand_var_stats` from the [MEconTools Package](#). This function summarizes statistics of matrixes stored in a container map, as well as scalar, string, function and other values stored in container maps.

## Test FF\_DISC\_RAND\_VAR\_STATS Defaults

Call the function with defaults.

```
ff_disc_rand_var_stats();
```

```
-----
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
Summary Statistics for: binom
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
-----
fl_choice_mean
  -1.0000

fl_choice_sd
   2.5100

fl_choice_coefofvar
  -2.5100

fl_choice_prob_zero
   0.1416

fl_choice_prob_below_zero
   0.5888

fl_choice_prob_above_zero
   0.2696

fl_choice_prob_max
  2.0589e-16

tb_disc_cumu
  binomDiscreteVal  binomDiscreteValProbMass  CDF  cumsumFrac
-----
      -10      2.2539e-05      0.0022539      0.00022539
      -9      0.00028979      0.031233      0.0028335
      -8      0.0018008      0.21132      0.01724
      -7      0.0072034      0.93166      0.067664
      -6      0.020838      3.0155      0.19269
      -5      0.04644      7.6595      0.42489
      -4      0.082928      15.952      0.75661
      -3      0.12185      28.138      1.1222
      -2      0.15014      43.152      1.4224
      -1      0.15729      58.881      1.5797

  binomDiscreteVal  binomDiscreteValProbMass  CDF  cumsumFrac
-----
      11      6.0392e-06      100      1
      12      1.0588e-06      100      1
      13      1.5784e-07      100      1
```

14	1.973e-08	100	1
15	2.0293e-09	100	1
16	1.6725e-10	100	1
17	1.0619e-11	100	1
18	4.8762e-13	100	1
19	1.4412e-14	100	1
20	2.0589e-16	100	1

tb_prob_drv percentiles	binomDiscreteValPercentileValues	fracOfSumHeldBelowThisPercentile
0.1	-8	0.01724
1	-6	0.19269
5	-5	0.42489
10	-4	0.75661
15	-4	0.75661
20	-3	1.1222
25	-3	1.1222
35	-2	1.4224
50	-1	1.5797
65	0	1.5797
75	1	1.4694
80	1	1.4694
85	2	1.3197
90	2	1.3197
95	3	1.1865
99	5	1.0412
99.9	7	1.0052

## Test FF\_DISC\_RAND\_VAR\_STATS 0 and 1 Random Variable

The simplest discrete random variable has two values, zero or one. The probability of zero is 30 percent, and 70 percent is the probability of one.

```
% Parameters
% 1. specify the random variable
st_var_name = 'bernoulli';
ar_choice_unique_sorted = [0, 1];
ar_choice_prob = [0.3, 0.7];
% 2. percentiles of interest
ar_fl_percentiles = [0.1 5 25 50 75 95 99.9];
% 3. print results
bl_display_drvstats = true;
% Call Function
[ds_stats_map] = ff_disc_rand_var_stats(st_var_name, ...
    ar_choice_unique_sorted, ar_choice_prob, ...
    ar_fl_percentiles, bl_display_drvstats);
```

```
-----
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
Summary Statistics for: bernoulli
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
-----
fl_choice_mean
    0.7000

fl_choice_sd
    0.4583
```

fl\_choice\_coefofvar  
0.6547

fl\_choice\_prob\_zero  
0.3000

fl\_choice\_prob\_below\_zero  
0

fl\_choice\_prob\_above\_zero  
0.7000

fl\_choice\_prob\_max  
0.7000

tb\_disc\_cumu

bernoulliDiscreteVal	bernoulliDiscreteValProbMass	CDF	cumsumFrac
0	0.3	30	0
1	0.7	100	1

bernoulliDiscreteVal	bernoulliDiscreteValProbMass	CDF	cumsumFrac
0	0.3	30	0
1	0.7	100	1

tb\_prob\_drv

percentiles	bernoulliDiscreteValPercentileValues	fracOfSumHeldBelowThisPercentile
0.1	0	0
5	0	0
25	0	0
50	1	1
75	1	1
95	1	1
99.9	1	1

## Test FF\_DISC\_RAND\_VAR\_STATS with Poisson

[Poisson random variable](#), with mean equals to ten, summarize over unsymmetric percentiles. Note that the poisson random variable has no upper bound.

```
% Parameters
% 1. specify the random variable
st_var_name = 'poisson';
mu = 10;
ar_choice_unique_sorted = 0:1:50;
ar_choice_prob = poisspdf(ar_choice_unique_sorted, mu);
% 2. percentiles of interest, unsymmetric
ar_fl_percentiles = [0.1 5 10 25 50 90 95 99 99.9 99.99 99.999 99.9999];
% 3. print results
bl_display_drvstats = true;
% Call Function
[ds_stats_map] = ff_disc_rand_var_stats(st_var_name, ...
    ar_choice_unique_sorted, ar_choice_prob, ...
    ar_fl_percentiles, bl_display_drvstats);
```

```

-----
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
Summary Statistics for: poisson
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
-----

```

```

fl_choice_mean
  10

fl_choice_sd
  3.1623

fl_choice_coefofvar
  0.3162

fl_choice_prob_zero
  4.5400e-05

fl_choice_prob_below_zero
  0

fl_choice_prob_above_zero
  1.0000

fl_choice_prob_max
  1.4927e-19

```

tb_disc_cumu	poissonDiscreteVal	poissonDiscreteValProbMass	CDF	cumsumFrac
	0	4.54e-05	0.00454	0
	1	0.000454	0.04994	4.54e-05
	2	0.00227	0.27694	0.0004994
	3	0.0075667	1.0336	0.0027694
	4	0.018917	2.9253	0.010336
	5	0.037833	6.7086	0.029253
	6	0.063055	13.014	0.067086
	7	0.090079	22.022	0.13014
	8	0.1126	33.282	0.22022
	9	0.12511	45.793	0.33282

poissonDiscreteVal	poissonDiscreteValProbMass	CDF	cumsumFrac
41	1.3571e-13	100	1
42	3.2313e-14	100	1
43	7.5146e-15	100	1
44	1.7079e-15	100	1
45	3.7953e-16	100	1
46	8.2506e-17	100	1
47	1.7554e-17	100	1
48	3.6572e-18	100	1
49	7.4636e-19	100	1
50	1.4927e-19	100	1

tb_prob_drv	percentiles	poissonDiscreteValPercentileValues	fracOfSumHeldBelowThisPercentile
	0.1	2	0.0004994
	5	5	0.029253
	10	6	0.067086
	25	8	0.22022
	50	10	0.45793

90	14	0.86446
95	15	0.91654
99	18	0.98572
99.9	21	0.99841
99.99	24	0.99988
99.999	26	0.99998
100	28	1

```
% Print out full Stored Matrix
% Note that the outputs are single row arrays.
ff_container_map_display(ds_stats_map, 100, 100)
```

```
-----
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
CONTAINER NAME: ds_stats_map ND Array (Matrix etc)
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
```

	i	idx	ndim	numel	rowN	colN	sum	mean	std	coefvari
ar_choice_perc_fracheld	1	1	2	12	1	12	7.54	0.62833	0.435	0.69231
ar_choice_percentiles	2	2	2	12	1	12	177	14.75	8.7399	0.59254
ar_fl_percentiles	3	3	2	12	1	12	773.99	64.499	42.887	0.66492

```

xxx TABLE:ar_choice_perc_fracheld XXXXXXXXXXXXXXXXXXXX
      c1      c2      c3      c4      c5      c6      c7      c8      c9      c10
-----
r1  0.0004994  0.029253  0.067086  0.22022  0.45793  0.86446  0.91654  0.98572  0.99841  0.99988

```

```

xxx TABLE:ar_choice_percentiles XXXXXXXXXXXXXXXXXXXX
      c1      c2      c3      c4      c5      c6      c7      c8      c9      c10      c11      c12
-----
r1  2      5      6      8      10     14     15     18     21     24     26     28

```

```

xxx TABLE:ar_fl_percentiles XXXXXXXXXXXXXXXXXXXX
      c1      c2      c3      c4      c5      c6      c7      c8      c9      c10      c11      c12
-----
r1  0.1      5      10     25     50     90     95     99     99.9  99.99  99.999  100

```

```

-----
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
CONTAINER NAME: ds_stats_map Scalars
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
```

	i	idx	value
fl_choice_coefofvar	1	4	0.31623
fl_choice_max	2	5	50
fl_choice_mean	3	6	10
fl_choice_min	4	7	0
fl_choice_prob_above_zero	5	8	0.99995
fl_choice_prob_below_zero	6	9	0
fl_choice_prob_max	7	10	1.4927e-19
fl_choice_prob_min	8	11	4.54e-05
fl_choice_prob_zero	9	12	4.54e-05
fl_choice_sd	10	13	3.1623