

FF_SUMM_ND_ARRAY Examples

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This is the example vignette for function: `ff_summ_nd_array` from the [MEconTools Package](#). This function summarizes policy and value functions over states.

Test FF_SUMM_ND_ARRAY Defaults

Call the function with defaults.

```
ff_summ_nd_array();
```

```
xxx Summ over (a,z), condi age as cols, kids/marriage as rows xxxxxxxxxxxxxxxxxxxxxxxxxxxx
group marry kids mean_age_18 mean_age_19 mean_age_20 mean_age_21
-----
1 0 1 0.53448 0.44448 0.5053 0.52914
2 1 1 0.4564 0.44512 0.44998 0.51775
3 0 2 0.52415 0.49903 0.48403 0.44429
4 1 2 0.49235 0.43684 0.44717 0.45226
5 0 3 0.4668 0.52676 0.49386 0.51855
6 1 3 0.47097 0.60345 0.58319 0.46238
7 0 4 0.55484 0.53601 0.53069 0.49323
8 1 4 0.5283 0.44091 0.53317 0.51062
```

Test FF_SUMM_ND_ARRAY with Random 2 Dimensional Matrix

Summarize over 6 dimensional array, iteratively change how many dimensions to group over.

First, generate matrix:

```
st_title = "Random 2D dimensional Array Testing Summarizing";
rng(123)
mn_polval = rand(5,4);
bl_print_table = true;
ar_st_stats = ["mean"];
cl_mp_datasetdesc = {};
cl_mp_datasetdesc{1} = containers.Map({'name', 'labval'}, ...
    {'a', linspace(0,1,size(mn_polval,1))});
cl_mp_datasetdesc{2} = containers.Map({'name', 'labval'}, ...
    {'z', linspace(-1,1,size(mn_polval,2))});
disp(mn_polval);
```

```
0.6965    0.4231    0.3432    0.7380
0.2861    0.9808    0.7290    0.1825
0.2269    0.6848    0.4386    0.1755
0.5513    0.4809    0.0597    0.5316
0.7195    0.3921    0.3980    0.5318
```

Second, show the entire matrix (no labels):

```
it_aggd = 0;
bl_row = 1;
ff_summ_nd_array(st_title, mn_polval, bl_print_table, ar_st_stats, it_aggd, bl_row);
```

```
xxx Random 2D dimensional Array Testing Summarizing xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
```

group	vardim2	mean_vardim1_1	mean_vardim1_2	mean_vardim1_3	mean_vardim1_4	mean_vardim1_5
1	1	0.69647	0.28614	0.22685	0.55131	0.71947
2	2	0.42311	0.98076	0.68483	0.48093	0.39212
3	3	0.34318	0.72905	0.43857	0.059678	0.39804
4	4	0.738	0.18249	0.17545	0.53155	0.53183

Third, rotate row and column, and now with labels:

```
it_aggd = 0;
bl_row = 1;
ar_permute = [2,1];
ff_summ_nd_array(st_title, mn_polval, bl_print_table, ar_st_stats, it_aggd, bl_row, ...
  cl_mp_datasetdesc, ar_permute);
```

```
xxx Random 2D dimensional Array Testing Summarizing xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
```

group	a	mean_z__1	mean_z__0_33333	mean_z__0_33333	mean_z__1
1	0	0.69647	0.42311	0.34318	0.738
2	0.25	0.28614	0.98076	0.72905	0.18249
3	0.5	0.22685	0.68483	0.43857	0.17545
4	0.75	0.55131	0.48093	0.059678	0.53155
5	1	0.71947	0.39212	0.39804	0.53183

Fourth, dimension one as columns, average over dim 2:

```
it_aggd = 1;
bl_row = 1;
ff_summ_nd_array(st_title, mn_polval, bl_print_table, ar_st_stats, it_aggd, bl_row, ...
  cl_mp_datasetdesc);
```

```
xxx Random 2D dimensional Array Testing Summarizing xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
```

group	x	mean_z__1	mean_z__0_33333	mean_z__0_33333	mean_z__1
1	1	0.49605	0.59235	0.3937	0.43186

Fifth, dimension one as rows, average over dim 2:

```
it_aggd = 1;
bl_row = 0;
ff_summ_nd_array(st_title, mn_polval, bl_print_table, ar_st_stats, it_aggd, bl_row, ...
  cl_mp_datasetdesc);
```

```
xxx Random 2D dimensional Array Testing Summarizing xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
```

group	z	sum	mean	std	coefvari	min	max
1	-1	2.4802	0.49605	0.22895	2.1666	0.22685	0.71947
2	-0.33333	2.9617	0.59235	0.24524	2.4154	0.39212	0.98076
3	0.33333	1.9685	0.3937	0.23907	1.6468	0.059678	0.72905
4	1	2.1593	0.43186	0.24575	1.7573	0.17545	0.738

Sixth, dimension two as rows, average over dim 1:

```
ar_permute = [2,1];
```

```

it_aggd = 1;
bl_row = 0;
ff_summ_nd_array(st_title, mn_polval, bl_print_table, ar_st_stats, it_aggd, bl_row, ...
    cl_mp_datasetdesc, ar_permute);

```

xxx	Random	2D	dimensional	Array	Testing	Summarizing	xxxxxxxxxxxxxxxxxxxxxxxxxxxx		
	group	a	sum	mean	std	coefvari	min	max	
	1	0	2.2007	0.55019	0.19636	2.8019	0.34318	0.738	
	2	0.25	2.1784	0.54461	0.37514	1.4518	0.18249	0.98076	
	3	0.5	1.5257	0.38143	0.23212	1.6432	0.17545	0.68483	
	4	0.75	1.6235	0.40587	0.23269	1.7443	0.059678	0.55131	
	5	1	2.0415	0.51036	0.15361	3.3226	0.39212	0.71947	

Test FF_SUMM_ND_ARRAY with Random 6 Dimensional Matrix

Summarize over 6 dimensional array, iteratively change how many dimensions to group over.

First, generate matrix:

```

st_title = "Random ND dimensional Array Testing Summarizing";
rng(123)
mn_polval = rand(8,7,6,5,4,3);
bl_print_table = true;
ar_st_stats = ["mean"];

```

Second, summarize over the first four dimensions, row group others:

```

it_aggd = 4;
bl_row = 0;
ff_summ_nd_array(st_title, mn_polval, bl_print_table, ar_st_stats, it_aggd, bl_row);

```

xxx	Random	ND	dimensional	Array	Testing	Summarizing	xxxxxxxxxxxxxxxxxxxxxxxxxxxx		
	group	vardim5	vardim6	sum	mean	std	coefvari	min	max
	1	1	1	836.78	0.49808	0.29255	1.7026	8.1888e-05	0.99964
	2	2	1	842.15	0.50128	0.28968	1.7305	6.7838e-05	0.99936
	3	3	1	831.45	0.49491	0.28851	1.7154	0.00091373	0.99989
	4	4	1	843.9	0.50232	0.28154	1.7842	0.00012471	0.99731
	5	1	2	838.99	0.4994	0.2911	1.7156	0.00029749	0.99938
	6	2	2	830.81	0.49453	0.28634	1.7271	0.00027113	0.9992
	7	3	2	832.59	0.49559	0.28682	1.7279	0.00035994	0.99936
	8	4	2	820.42	0.48835	0.29032	1.6821	0.00096259	0.99896
	9	1	3	870.56	0.51819	0.29111	1.7801	0.0010616	0.99951
	10	2	3	854.68	0.50874	0.28458	1.7877	0.001884	0.99965
	11	3	3	838.29	0.49898	0.2891	1.726	0.0019192	0.99945
	12	4	3	842.83	0.50169	0.2877	1.7438	0.00016871	0.99963

Third, summarize over the first four dimensions, column group 5th, and row group others:

```

it_aggd = 4;
bl_row = 1;
ff_summ_nd_array(st_title, mn_polval, bl_print_table, ["sum"], it_aggd, bl_row);

```

xxx	Random	ND	dimensional	Array	Testing	Summarizing	xxxxxxxxxxxxxxxxxxxxxxxxxxxx		
	group	vardim6	sum_vardim5_1	sum_vardim5_2	sum_vardim5_3	sum_vardim5_4			

1	1	836.78	842.15	831.45	843.9
2	2	838.99	830.81	832.59	820.42
3	3	870.56	854.68	838.29	842.83

Fourth, summarize over the first five dimensions, column group 6th, no row groups:

```
it_aggd = 5;
bl_row = 1;
ff_summ_nd_array(st_title, mn_polval, bl_print_table, ["mean", "std"], it_aggd, bl_row);
```

xxx	Random	ND	dimensional	Array	Testing	Summarizing	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx			
group	x		mean_var	dim6_1	mean_var	dim6_2	mean_var	dim6_3	std_var	dim6_1
1	1		0.49915		0.49447		0.5069		0.28805	

Fifth, summarize over all six dimensions, summary statistics over the entire dataframe:

```
it_aggd = 6;
bl_row = 0;
ff_summ_nd_array(st_title, mn_polval, bl_print_table, ar_st_stats, it_aggd, bl_row);
```

xxx	Random	ND	dimensional	Array	Testing	Summarizing	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx			
group	x		sum	mean	std	coefvari	min		max	
1	1		10083	0.50017	0.28831	1.7349	6.7838e-05		0.99989	

Test FF_SUMM_ND_ARRAY with Random 7 Dimensional Matrix with All Parameters

Given a random seven dimensional matrix, average over the 2nd, 4th and 5th dimensionals. Show as row groups the 3, 6 and 7th dimensions, and row groups the 1st dimension. Show Coefficient of Variation only.

```
st_title = "avg VALUE 2+4+5th dims. groups 3+6+7th dims, and row groups the 1st dim.";
rng(123)
mn_polval = rand(3,10,2,10,10,2,3);
ar_permute = [2,4,5,1,3,6,7];
bl_print_table = true;
ar_st_stats = ["coefvari"];
it_aggd = 3; % mean over 3 dims
bl_row = 1; % one var for row group
cl_mp_datasetdesc = {};
cl_mp_datasetdesc{1} = containers.Map({'name', 'labval'}, ...
    {'age', [18, 19, 20]});
cl_mp_datasetdesc{2} = containers.Map({'name', 'labval'}, ...
    {'savings', linspace(0,1,10)});
cl_mp_datasetdesc{3} = containers.Map({'name', 'labval'}, ...
    {'borrsave', [-1,+1]});
cl_mp_datasetdesc{4} = containers.Map({'name', 'labval'}, ...
    {'shocka', linspace(-5,5,10)});
cl_mp_datasetdesc{5} = containers.Map({'name', 'labval'}, ...
    {'shockb', linspace(-5,5,10)});
cl_mp_datasetdesc{6} = containers.Map({'name', 'labval'}, ...
    {'marry', [0,1]});
```

```

cl_mp_datasetdesc{7} = containers.Map({'name', 'labval'}, ...
    {'region', [1,2,3]});
% call function
ff_summ_nd_array(st_title, mn_polval, bl_print_table, ar_st_stats, it_aggd, bl_row, cl_mp_data)

```

```

xxx  avg VALUE 2+4+5th dims. groups 3+6+7th dims, and row groups the 1st dim. xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
    group      borrsave      marry      region      cv_age_18      cv_age_19      cv_age_20
    -----
     1          -1           0           1           1.7607           1.7534           1.7065
     2           1           0           1           1.6566           1.7501           1.7042
     3          -1           1           1           1.6608           1.7658           1.7291
     4           1           1           1           1.756            1.7479           1.7606
     5          -1           0           2           1.7314           1.7506           1.786
     6           1           0           2           1.7347           1.728            1.738
     7          -1           1           2           1.7811           1.755            1.7568
     8           1           1           2           1.7445           1.7398           1.7746
     9          -1           0           3           1.7025           1.7286            1.69
    10           1           0           3           1.74            1.7549           1.7356
    11          -1           1           3           1.7147           1.7287           1.7341
    12           1           1           3           1.7919           1.7313           1.7452

```