

Python cProfile Results

Forest Problem

States = 100, Actions = 2, n = 1

| 104035 function calls (103908 primitive calls) in 0.383 seconds | | | | | |
|---|---------|---------|---------|---------|---|
| Ordered by: cumulative time | | | | | |
| ncalls | tottime | percall | cumtime | percall | filename:lineno(function) |
| 1 | 0.001 | 0.001 | 0.384 | 0.384 | vi.py:3(<module>) |
| 1 | 0.001 | 0.001 | 0.272 | 0.272 | vi.py:57(run) |
| 63 | 0.061 | 0.001 | 0.252 | 0.004 | final_mdp.py:219(_bellmanOperator_mpi) |
| 6300 | 0.045 | 0.000 | 0.175 | 0.000 | final_mdp.py:263(myfunc_mpi) |
| 19251 | 0.114 | 0.000 | 0.114 | 0.000 | {numpy.core.multiarray.array} |
| 3 | 0.013 | 0.004 | 0.105 | 0.035 | __init__.py:1(<module>) |
| 1 | 0.002 | 0.002 | 0.078 | 0.078 | __init__.py:106(<module>) |
| 1 | 0.000 | 0.000 | 0.060 | 0.060 | add_newdocs.py:10(<module>) |
| 1 | 0.000 | 0.000 | 0.047 | 0.047 | type_check.py:3(<module>) |
| 12800 | 0.018 | 0.000 | 0.018 | 0.000 | {method 'dot' of 'numpy.ndarray' objects} |
| 1 | 0.001 | 0.001 | 0.018 | 0.018 | __init__.py:7(<module>) |
| 1 | 0.001 | 0.001 | 0.014 | 0.014 | _internal.py:6(<module>) |
| 1 | 0.002 | 0.002 | 0.011 | 0.011 | __init__.py:204(<module>) |
| 1 | 0.001 | 0.001 | 0.011 | 0.011 | utils.py:4(<module>) |
| 1 | 0.001 | 0.001 | 0.010 | 0.010 | vi.py:25(_boundIter) |
| 12802 | 0.010 | 0.000 | 0.010 | 0.000 | {method 'reshape' of 'numpy.ndarray' objects} |
| 189 | 0.009 | 0.000 | 0.009 | 0.000 | {method 'bcast' of 'mpi4py.MPI.Comm' objects} |
| 1 | 0.002 | 0.002 | 0.008 | 0.008 | final_mdp.py:281(_bellmanOperator) |
| 1 | 0.000 | 0.000 | 0.008 | 0.008 | __init__.py:51(<module>) |
| 1 | 0.001 | 0.001 | 0.008 | 0.008 | tempfile.py:18(<module>) |

States = 100, Actions = 2, n = 10

| 23781 function calls (23654 primitive calls) in 2.446 seconds | | | | | |
|---|---------|---------|---------|---------|---|
| Ordered by: cumulative time | | | | | |
| ncalls | tottime | percall | cumtime | percall | filename:lineno(function) |
| 1 | 0.001 | 0.001 | 2.446 | 2.446 | vi.py:3(<module>) |
| 1 | 0.002 | 0.002 | 1.909 | 1.909 | vi.py:57(run) |
| 189 | 1.847 | 0.010 | 1.847 | 0.010 | {method 'bcast' of 'mpi4py.MPI.Comm' objects} |
| 3 | 0.047 | 0.016 | 0.426 | 0.142 | __init__.py:1(<module>) |
| 1 | 0.014 | 0.014 | 0.306 | 0.306 | __init__.py:106(<module>) |
| 1 | 0.000 | 0.000 | 0.249 | 0.249 | add_newdocs.py:10(<module>) |
| 1 | 0.000 | 0.000 | 0.197 | 0.197 | type_check.py:3(<module>) |
| 1 | 0.000 | 0.000 | 0.178 | 0.178 | __init__.py:51(<module>) |
| 1 | 0.178 | 0.178 | 0.178 | 0.178 | final_mdp.py:30(<module>) |
| 1 | 0.001 | 0.001 | 0.084 | 0.084 | _internal.py:6(<module>) |

States = 100, Actions = 2, n = 20

19686 function calls (19559 primitive calls) in 4.559 seconds

Ordered by: cumulative time

| ncalls | tottime | percall | cumtime | percall | filename:lineno(function) |
|--------|---------|---------|---------|---------|---|
| 1 | 0.001 | 0.001 | 4.559 | 4.559 | vi.py:3(<module>) |
| 1 | 0.002 | 0.002 | 3.549 | 3.549 | vi.py:57(run) |
| 189 | 3.513 | 0.019 | 3.513 | 0.019 | {method 'bcast' of 'mpi4py.MPI.Comm' objects} |
| 3 | 0.100 | 0.033 | 0.610 | 0.203 | __init__.py:1(<module>) |
| 1 | 0.000 | 0.000 | 0.441 | 0.441 | __init__.py:51(<module>) |
| 1 | 0.441 | 0.441 | 0.441 | 0.441 | final_mdp.py:30(<module>) |
| 1 | 0.002 | 0.002 | 0.433 | 0.433 | __init__.py:106(<module>) |
| 1 | 0.000 | 0.000 | 0.354 | 0.354 | add_newdocs.py:10(<module>) |
| 1 | 0.000 | 0.000 | 0.275 | 0.275 | type_check.py:3(<module>) |
| 1 | 0.001 | 0.001 | 0.093 | 0.093 | _internal.py:6(<module>) |
| 1 | 0.001 | 0.001 | 0.064 | 0.064 | __init__.py:7(<module>) |
| 1 | 0.002 | 0.002 | 0.060 | 0.060 | __init__.py:204(<module>) |
| 1 | 0.001 | 0.001 | 0.056 | 0.056 | vi.py:25(_boundIter) |
| 1 | 0.050 | 0.050 | 0.051 | 0.051 | __init__.py:4(<module>) |
| 1 | 0.001 | 0.001 | 0.050 | 0.050 | utils.py:4(<module>) |
| 1 | 0.001 | 0.001 | 0.047 | 0.047 | tempfile.py:18(<module>) |
| 1 | 0.018 | 0.018 | 0.041 | 0.041 | final_mdp.py:281(_bellmanOperator) |
| 1 | 0.018 | 0.018 | 0.039 | 0.039 | __init__.py:41(<module>) |
| 1 | 0.001 | 0.001 | 0.039 | 0.039 | numerictypes.py:82(<module>) |
| 16 | 0.001 | 0.000 | 0.038 | 0.002 | abc.py:86(__new__) |

States = 100, Actions = 2, n = 50

17229 function calls (17102 primitive calls) in 13.613 seconds

Ordered by: cumulative time

| ncalls | tottime | percall | cumtime | percall | filename:lineno(function) |
|--------|---------|---------|---------|---------|---|
| 1 | 0.001 | 0.001 | 13.614 | 13.614 | vi.py:3(<module>) |
| 1 | 0.002 | 0.002 | 11.150 | 11.150 | vi.py:57(run) |
| 189 | 11.128 | 0.059 | 11.128 | 0.059 | {method 'bcast' of 'mpi4py.MPI.Comm' objects} |
| 3 | 0.149 | 0.050 | 1.305 | 0.435 | __init__.py:1(<module>) |
| 1 | 0.054 | 0.054 | 1.097 | 1.097 | __init__.py:106(<module>) |
| 1 | 0.000 | 0.000 | 1.038 | 1.038 | __init__.py:51(<module>) |
| 1 | 1.037 | 1.037 | 1.038 | 1.038 | final_mdp.py:30(<module>) |
| 1 | 0.000 | 0.000 | 0.780 | 0.780 | add_newdocs.py:10(<module>) |
| 1 | 0.000 | 0.000 | 0.579 | 0.579 | type_check.py:3(<module>) |
| 1 | 0.001 | 0.001 | 0.256 | 0.256 | __init__.py:7(<module>) |
| 1 | 0.001 | 0.001 | 0.171 | 0.171 | _internal.py:6(<module>) |
| 28 | 0.000 | 0.000 | 0.167 | 0.006 | re.py:230(_compile) |
| 18 | 0.000 | 0.000 | 0.166 | 0.009 | sre_compile.py:567(compile) |
| 1 | 0.046 | 0.046 | 0.164 | 0.164 | __init__.py:204(<module>) |
| 1 | 0.001 | 0.001 | 0.161 | 0.161 | vi.py:25(_boundIter) |
| 1 | 0.049 | 0.049 | 0.153 | 0.153 | utils.py:4(<module>) |
| 1 | 0.130 | 0.130 | 0.136 | 0.136 | final_mdp.py:281(_bellmanOperator) |
| 17 | 0.000 | 0.000 | 0.114 | 0.007 | re.py:192(compile) |
| 18 | 0.000 | 0.000 | 0.111 | 0.006 | sre_compile.py:552(_code) |
| 990 | 0.107 | 0.000 | 0.107 | 0.000 | {isinstance} |

States = 200, Actions = 2, n = 1

```
193962 function calls (193835 primitive calls) in 1.147 seconds

Ordered by: cumulative time

ncalls  tottime  percall  cumtime  percall filename:lineno(function)
      1   0.002    0.002    1.147    1.147 vi.py:3(<module>)
      1   0.002    0.002    1.013    1.013 vi.py:58(run)
     63   0.128    0.002    0.985    0.016 final_mdp.py:219(_bellmanOperator_mpi)
    12600   0.092    0.000    0.821    0.000 final_mdp.py:263(myfunc_mpi)
   38451   0.706    0.000    0.706    0.000 {numpy.core.multiarray.array}
      3   0.013    0.004    0.095    0.032 __init__.py:1(<module>)
      1   0.002    0.002    0.073    0.073 __init__.py:106(<module>)
      1   0.000    0.000    0.055    0.055 add_newdocs.py:10(<module>)
      1   0.000    0.000    0.043    0.043 type_check.py:3(<module>)
   25600   0.039    0.000    0.039    0.000 {method 'dot' of 'numpy.ndarray' objects}
      1   0.002    0.002    0.032    0.032 vi.py:26(_boundIter)
      1   0.003    0.003    0.028    0.028 final_mdp.py:281(_bellmanOperator)
     200   0.005    0.000    0.024    0.000 final_mdp.py:318(myfunc)
   25602   0.021    0.000    0.021    0.000 {method 'reshape' of 'numpy.ndarray' objects}
      1   0.001    0.001    0.017    0.017 __init__.py:7(<module>)
      2   0.000    0.000    0.015    0.007 numeric.py:1737(array_str)
      2   0.000    0.000    0.015    0.007 arrayprint.py:340(array2string)
      2   0.000    0.000    0.015    0.007 arrayprint.py:237(_array2string)
      1   0.000    0.000    0.013    0.013 __init__.py:51(<module>)
      1   0.013    0.013    0.013    0.013 final_mdp.py:30(<module>)
   12800   0.008    0.000    0.013    0.000 fromnumeric.py:501(transpose)
```

States = 200, Actions = 2, n = 10

```
33772 function calls (33645 primitive calls) in 3.103 seconds

Ordered by: cumulative time

ncalls  tottime  percall  cumtime  percall filename:lineno(function)
      1   0.00133772    0.001    3.111    3.111 vi.py:3(<module>)
      1   0.003 function calls (33645 primitive calls) in 3.090 seconds

Ordered by: cumulative time

ncalls  tottime  percall  cumtime  percall filename:lineno(function)
    0.003      1    2.358    2.358    0.001    0.001    3.090    3.090 vi.py:3(<module>)
      1   0.008    0.008    2.344    2.344 vi.py:58(run)
     189   1.817    0.010    1.817    0.010 {method 'bcast' of 'mpi4py.MPI.Comm' objects}
     63   0.066    0.001    0.495    0.008 final_mdp.py:219(_bellmanOperator_mpi)
      3   0.039    0.013    0.481    0.160 __init__.py:1(<module>)
   4421   0.450    0.000    0.450    0.000 {numpy.core.multiarray.array}
    1260   0.034    0.000    0.422    0.000 final_mdp.py:263(myfunc_mpi)
      1   0.002    0.002    0.331    0.331 __init__.py:106(<module>)
      1   0.010    0.010    0.275    0.275 add_newdocs.py:10(<module>)
      1   0.000    0.000    0.219    0.219 type_check.py:3(<module>)
      1   0.000    0.000    0.206    0.206 __init__.py:51(<module>)
      1   0.206    0.206    0.206    0.206 final_mdp.py:30(<module>)
      1   0.003    0.003    0.175    0.175 vi.py:26(_boundIter)
      1   0.020    0.020    0.169    0.169 final_mdp.py:281(_bellmanOperator)
     200   0.058    0.000    0.148    0.001 final_mdp.py:318(myfunc)
      1   0.001    0.001    0.075    0.075 __init__.py:7(<module>)
      1   0.002    0.002    0.064    0.064 numeric.py:1(<module>)
      1   0.001    0.001    0.062    0.062 collections.py:1(<module>)
```

States = 200, Actions = 2, n = 20

| Ordered by: cumulative time | | | | | |
|-----------------------------|----------|---------|---------|---------|---|
| ncalls | totttime | percall | cumtime | percall | filename:lineno(function) |
| 1 | 0.001 | 0.001 | 5.082 | 5.082 | vi.py:3(<module>) |
| 1 | 0.003 | 0.003 | 3.748 | 3.748 | vi.py:58(run) |
| 189 | 3.470 | 0.018 | 3.470 | 0.018 | {method 'bcast' of 'mpi4py.MPI.Comm' objects} |
| 3 | 0.062 | 0.021 | 0.714 | 0.238 | __init__.py:1(<module>) |
| 2531 | 0.548 | 0.000 | 0.548 | 0.000 | {numpy.core.multiarray.array} |
| 1 | 0.002 | 0.002 | 0.479 | 0.479 | __init__.py:106(<module>) |
| 1 | 0.016 | 0.016 | 0.413 | 0.413 | vi.py:26(_boundIter) |
| 1 | 0.000 | 0.000 | 0.383 | 0.383 | add_newdocs.py:10(<module>) |
| 1 | 0.005 | 0.005 | 0.378 | 0.378 | final_mdp.py:281(_bellmanOperator) |
| 1 | 0.000 | 0.000 | 0.378 | 0.378 | __init__.py:51(<module>) |
| 1 | 0.377 | 0.377 | 0.377 | 0.377 | final_mdp.py:30(<module>) |
| 200 | 0.023 | 0.000 | 0.369 | 0.002 | final_mdp.py:318(myfunc) |
| 1 | 0.000 | 0.000 | 0.310 | 0.310 | type_check.py:3(<module>) |
| 63 | 0.029 | 0.000 | 0.268 | 0.004 | final_mdp.py:219(_bellmanOperator_mpi) |
| 630 | 0.011 | 0.000 | 0.235 | 0.000 | final_mdp.py:263(myfunc_mpi) |
| 1 | 0.001 | 0.001 | 0.141 | 0.141 | _internal.py:6(<module>) |
| 16 | 0.097 | 0.006 | 0.111 | 0.007 | abc.py:86(__new__) |
| 1 | 0.017 | 0.017 | 0.094 | 0.094 | __init__.py:7(<module>) |
| 1 | 0.001 | 0.001 | 0.084 | 0.084 | numerictypes.py:82(<module>) |
| 1 | 0.000 | 0.000 | 0.081 | 0.081 | numbers.py:6(<module>) |
| 28 | 0.000 | 0.000 | 0.057 | 0.002 | re.py:230(_compile) |
| 18 | 0.000 | 0.000 | 0.057 | 0.003 | sre_compile.py:567(compile) |

States = 200, Actions = 2, n = 50

| Ordered by: cumulative time | | | | | |
|-----------------------------|----------|---------|---------|---------|---|
| ncalls | totttime | percall | cumtime | percall | filename:lineno(function) |
| 1 | 0.050 | 0.050 | 14.589 | 14.589 | vi.py:3(<module>) |
| 1 | 0.003 | 0.003 | 11.322 | 11.322 | vi.py:58(run) |
| 189 | 11.197 | 0.059 | 11.197 | 0.059 | {method 'bcast' of 'mpi4py.MPI.Comm' objects} |
| 3 | 0.225 | 0.075 | 1.355 | 0.452 | __init__.py:1(<module>) |
| 1 | 0.052 | 0.052 | 1.040 | 1.040 | __init__.py:106(<module>) |
| 1 | 0.003 | 0.003 | 1.037 | 1.037 | vi.py:26(_boundIter) |
| 1 | 0.071 | 0.071 | 0.988 | 0.988 | final_mdp.py:281(_bellmanOperator) |
| 1 | 0.000 | 0.000 | 0.973 | 0.973 | __init__.py:51(<module>) |
| 1 | 0.973 | 0.973 | 0.973 | 0.973 | final_mdp.py:30(<module>) |
| 200 | 0.244 | 0.001 | 0.876 | 0.004 | final_mdp.py:318(myfunc) |
| 1 | 0.000 | 0.000 | 0.796 | 0.796 | add_newdocs.py:10(<module>) |
| 1397 | 0.745 | 0.001 | 0.745 | 0.001 | {numpy.core.multiarray.array} |
| 1 | 0.000 | 0.000 | 0.623 | 0.623 | type_check.py:3(<module>) |
| 1 | 0.001 | 0.001 | 0.233 | 0.233 | __init__.py:7(<module>) |
| 1 | 0.049 | 0.049 | 0.181 | 0.181 | utils.py:4(<module>) |
| 1 | 0.001 | 0.001 | 0.167 | 0.167 | _internal.py:6(<module>) |
| 1 | 0.001 | 0.001 | 0.130 | 0.130 | tempfile.py:18(<module>) |
| 63 | 0.006 | 0.000 | 0.116 | 0.002 | final_mdp.py:219(_bellmanOperator_mpi) |
| 252 | 0.004 | 0.000 | 0.108 | 0.000 | final_mdp.py:263(myfunc_mpi) |
| 1 | 0.027 | 0.027 | 0.105 | 0.105 | __init__.py:204(<module>) |
| 1 | 0.007 | 0.007 | 0.092 | 0.092 | __init__.py:4(<module>) |
| 1 | 0.002 | 0.002 | 0.085 | 0.085 | __init__.py:41(<module>) |

States = 500, Actions = 2, n = 1

463737 function calls (463610 primitive calls) in 21.995 seconds

Ordered by: cumulative time

| ncalls | tottime | percall | cumtime | percall | filename:lineno(function) |
|--------|---------|---------|---------|---------|---|
| 1 | 0.001 | 0.001 | 21.995 | 21.995 | vi.py:3(<module>) |
| 1 | 0.002 | 0.002 | 21.563 | 21.563 | vi.py:57(run) |
| 63 | 1.023 | 0.016 | 21.507 | 0.341 | final_mdp.py:219(_bellmanOperator_mpi) |
| 31500 | 0.861 | 0.000 | 20.322 | 0.001 | final_mdp.py:263(myfunc_mpi) |
| 96051 | 19.213 | 0.000 | 19.213 | 0.000 | {numpy.core.multiarray.array} |
| 64000 | 0.335 | 0.000 | 0.335 | 0.000 | {method 'dot' of 'numpy.ndarray' objects} |
| 1 | 0.009 | 0.009 | 0.332 | 0.332 | vi.py:25(_boundIter) |
| 1 | 0.012 | 0.012 | 0.316 | 0.316 | final_mdp.py:281(_bellmanOperator) |
| 500 | 0.027 | 0.000 | 0.302 | 0.001 | final_mdp.py:318(myfunc) |
| 64002 | 0.196 | 0.000 | 0.196 | 0.000 | {method 'reshape' of 'numpy.ndarray' objects} |
| 32000 | 0.075 | 0.000 | 0.108 | 0.000 | fromnumeric.py:501(transpose) |
| 3 | 0.012 | 0.004 | 0.097 | 0.032 | __init__.py:1(<module>) |
| 1 | 0.002 | 0.002 | 0.073 | 0.073 | __init__.py:106(<module>) |
| 1 | 0.000 | 0.000 | 0.056 | 0.056 | add_newdocs.py:10(<module>) |
| 1 | 0.000 | 0.000 | 0.044 | 0.044 | type_check.py:3(<module>) |
| 2 | 0.000 | 0.000 | 0.037 | 0.019 | numeric.py:1737(array_str) |
| 2 | 0.000 | 0.000 | 0.037 | 0.019 | arrayprint.py:340(array2string) |
| 2 | 0.000 | 0.000 | 0.037 | 0.018 | arrayprint.py:237(_array2string) |
| 32000 | 0.033 | 0.000 | 0.033 | 0.000 | {method 'transpose' of 'numpy.ndarray' objects} |
| 65519 | 0.032 | 0.000 | 0.032 | 0.000 | {method 'append' of 'list' objects} |
| 2 | 0.002 | 0.001 | 0.031 | 0.015 | arrayprint.py:458(_formatArray) |
| 1000 | 0.014 | 0.000 | 0.027 | 0.000 | arrayprint.py:594(__call__) |

States = 500, Actions = 2, n = 10

63741 function calls (63614 primitive calls) in 22.235 seconds

Ordered by: cumulative time

| ncalls | tottime | percall | cumtime | percall | filename:lineno(function) |
|--------|---------|---------|---------|---------|---|
| 1 | 0.006 | 0.006 | 22.235 | 22.235 | vi.py:3(<module>) |
| 1 | 0.005 | 0.005 | 19.105 | 19.105 | vi.py:57(run) |
| 10991 | 15.496 | 0.001 | 15.496 | 0.001 | {numpy.core.multiarray.array} |
| 63 | 0.612 | 0.010 | 14.841 | 0.236 | final_mdp.py:219(_bellmanOperator_mpi) |
| 3150 | 0.505 | 0.000 | 14.120 | 0.004 | final_mdp.py:263(myfunc_mpi) |
| 189 | 4.218 | 0.022 | 4.218 | 0.022 | {method 'bcast' of 'mpi4py.MPI.Comm' objects} |
| 1 | 0.013 | 0.013 | 2.616 | 2.616 | vi.py:25(_boundIter) |
| 1 | 0.106 | 0.106 | 2.576 | 2.576 | final_mdp.py:281(_bellmanOperator) |
| 500 | 0.220 | 0.000 | 2.463 | 0.005 | final_mdp.py:318(myfunc) |
| 3 | 0.037 | 0.012 | 0.487 | 0.162 | __init__.py:1(<module>) |
| 1 | 0.003 | 0.003 | 0.289 | 0.289 | __init__.py:106(<module>) |
| 1 | 0.000 | 0.000 | 0.267 | 0.267 | add_newdocs.py:10(<module>) |
| 7300 | 0.231 | 0.000 | 0.231 | 0.000 | {method 'dot' of 'numpy.ndarray' objects} |
| 1 | 0.000 | 0.000 | 0.223 | 0.223 | type_check.py:3(<module>) |
| 1 | 0.000 | 0.000 | 0.169 | 0.169 | __init__.py:51(<module>) |
| 1 | 0.169 | 0.169 | 0.169 | 0.169 | final_mdp.py:30(<module>) |
| 7302 | 0.159 | 0.000 | 0.159 | 0.000 | {method 'reshape' of 'numpy.ndarray' objects} |
| 1 | 0.001 | 0.001 | 0.095 | 0.095 | _internal.py:6(<module>) |

States = 500, Actions = 2, n = 20

```
43266 function calls (43139 primitive calls) in 26.746 seconds
```

Ordered by: cumulative time

| ncalls | tottime | percall | cumtime | percall | filename:lineno(function) |
|--------|---------|---------|---------|---------|---|
| 1 | 0.001 | 0.001 | 26.747 | 26.747 | vi.py:3(<module>) |
| 1 | 0.016 | 0.016 | 20.441 | 20.441 | vi.py:57(run) |
| 6266 | 18.021 | 0.003 | 18.021 | 0.003 | {numpy.core.multiarray.array} |
| 63 | 0.733 | 0.012 | 15.012 | 0.238 | final_mdp.py:219(_bellmanOperator_mpi) |
| 1575 | 0.493 | 0.000 | 14.132 | 0.009 | final_mdp.py:263(myfunc_mpi) |
| 1 | 0.071 | 0.071 | 5.437 | 5.437 | vi.py:25(_boundIter) |
| 189 | 5.341 | 0.028 | 5.341 | 0.028 | {method 'bcast' of 'mpi4py.MPI.Comm' objects} |
| 1 | 0.214 | 0.214 | 5.314 | 5.314 | final_mdp.py:281(_bellmanOperator) |
| 500 | 0.385 | 0.001 | 5.036 | 0.010 | final_mdp.py:318(myfunc) |
| 3 | 0.046 | 0.015 | 0.641 | 0.214 | __init__.py:1(<module>) |
| 1 | 0.002 | 0.002 | 0.449 | 0.449 | __init__.py:106(<module>) |
| 1 | 0.000 | 0.000 | 0.363 | 0.363 | add_newdocs.py:10(<module>) |
| 1 | 0.000 | 0.000 | 0.311 | 0.311 | __init__.py:51(<module>) |

States = 500, Actions = 2, n = 50

```
30981 function calls (30854 primitive calls) in 39.083 seconds
```

Ordered by: cumulative time

| ncalls | tottime | percall | cumtime | percall | filename:lineno(function) |
|--------|---------|---------|---------|---------|---|
| 1 | 0.129 | 0.129 | 39.083 | 39.083 | vi.py:3(<module>) |
| 1 | 0.100 | 0.100 | 23.438 | 23.438 | vi.py:57(run) |
| 3431 | 21.748 | 0.006 | 21.748 | 0.006 | {numpy.core.multiarray.array} |
| 63 | 0.323 | 0.005 | 12.572 | 0.200 | final_mdp.py:219(_bellmanOperator_mpi) |
| 1 | 0.197 | 0.197 | 12.359 | 12.359 | vi.py:25(_boundIter) |
| 630 | 0.565 | 0.001 | 12.097 | 0.019 | final_mdp.py:263(myfunc_mpi) |
| 1 | 0.298 | 0.298 | 12.038 | 12.038 | final_mdp.py:281(_bellmanOperator) |
| 500 | 1.145 | 0.002 | 11.636 | 0.023 | final_mdp.py:318(myfunc) |
| 189 | 10.704 | 0.057 | 10.704 | 0.057 | {method 'bcast' of 'mpi4py.MPI.Comm' objects} |
| 3 | 0.417 | 0.139 | 2.304 | 0.768 | __init__.py:1(<module>) |
| 1 | 0.088 | 0.088 | 1.614 | 1.614 | __init__.py:106(<module>) |
| 1 | 0.007 | 0.007 | 1.292 | 1.292 | add_newdocs.py:10(<module>) |
| 1 | 0.014 | 0.014 | 1.233 | 1.233 | __init__.py:51(<module>) |
| 1 | 1.219 | 1.219 | 1.219 | 1.219 | final_mdp.py:30(<module>) |
| 1 | 0.005 | 0.005 | 1.027 | 1.027 | type_check.py:3(<module>) |
| 1 | 0.024 | 0.024 | 0.441 | 0.441 | __init__.py:7(<module>) |
| 1 | | 0.015 | 0.015 | 0.322 | 0.322 utils.py:4(<module>) |
| 1 | 0.048 | 0.048 | 0.274 | 0.274 | tempfile.py:18(<module>) |
| 2260 | 0.271 | 0.000 | 0.271 | 0.000 | {method 'dot' of 'numpy.ndarray' objects} |
| 1 | 0.068 | 0.068 | 0.233 | 0.233 | __init__.py:204(<module>) |
| 1 | 0.008 | 0.008 | 0.224 | 0.224 | random.py:40(<module>) |

States = 2000, Actions = 2, n = 1

```
1812622 function calls (1812495 primitive calls) in 2908.964 seconds

Ordered by: cumulative time

ncalls  tottime  percall  cumtime  percall filename:lineno(function)
      1     0.176    0.176 2908.965 2908.965 vi.py:3(<module>)
      1     0.004    0.004 2873.857 2873.857 vi.py:58(run)
      63    84.273    1.338 2873.647   45.613 final_mdp.py:219(_bellmanOperator_mpi)
384051 2812.767    0.007 2812.767    0.007 {numpy.core.multiarray.array}
126000    4.785    0.000 2787.711    0.022 final_mdp.py:263(myfunc_mpi)
      1     0.051    0.051   32.820   32.820 vi.py:26(_boundIter)
      1     0.066    0.066   32.734   32.734 final_mdp.py:281(_bellmanOperator)
    2000    0.554    0.000   32.650    0.016 final_mdp.py:318(myfunc)
      3     0.356    0.119    2.145    0.715 __init__.py:1(<module>)
256000    2.097    0.000    2.097    0.000 {method 'dot' of 'numpy.ndarray' objects}
      1     0.105    0.105    1.474    1.474 __init__.py:106(<module>)
      1     0.027    0.027    1.193    1.193 add_newdocs.py:10(<module>)
256002    1.097    0.000    1.097    0.000 {method 'reshape' of 'numpy.ndarray' objects}
      1     0.006    0.006    0.984    0.984 type_check.py:3(<module>)
128000    0.356    0.000    0.517    0.000 fromnumeric.py:501(transpose)
      1     0.050    0.050    0.470    0.470 __init__.py:7(<module>)
      1     0.028    0.028    0.329    0.329 utils.py:4(<module>)
      1     0.033    0.033    0.285    0.285 tempfile.py:18(<module>)
      1     0.044    0.044    0.263    0.263 __init__.py:204(<module>)
      1     0.028    0.028    0.237    0.237 random.py:40(<module>)
      1     0.208    0.208    0.208    0.208 hashlib.py:56(<module>)
```

States = 2000, Actions = 2, n = 10

```
213592 function calls (213465 primitive calls) in 3437.435 seconds

Ordered by: cumulative time

ncalls  tottime  percall  cumtime  percall filename:lineno(function)
      1     0.001    0.001 3437.435 3437.435 vi.py:3(<module>)
      1     0.005213592 function calls (213465 primitive calls) in 3437.422 seconds

Ordered by: cumulative time

ncalls  tottime  percall  cumtime  percall filename:lineno(function)
      1     0.001    0.001 3437.422 3437.422 vi.py:3(<module>)
      1     0.016    0.016 3124.020 3124.020 vi.py:58(run)
43841 3097.734    0.071 3097.734    0.071 {numpy.core.multiarray.array}
      63   231.400    3.673    0.005 3123.497 3123.497 vi.py:58(run)
43841 3061.663    0.070 3061.663    0.070 {numpy.core.multiarray.array}
      63   232.391    3.689 3005.886   47.712 final_mdp.py:219(_bellmanOperator_mpi)
12600    1.930    0.000 2772.575    0.220 final_mdp.py:263(myfunc_mpi)
      1     0.846    0.846   313.049   313.049 vi.py:26(_boundIter)
      1     0.578    0.578   312.088   312.088 final_mdp.py:281(_bellmanOperator)
    2000   19.291    0.010   311.351    0.156 final_mdp.py:318(myfunc)
    189   117.591    0.622   117.591    0.622 {method 'bcast' of 'mpi4py.MPI.Comm' objects}
29200    1.217    0.000    1.217    0.000 {method 'dot' of 'numpy.ndarray' objects}
29202    0.587    0.000    0.587    0.000 {method 'reshape' of 'numpy.ndarray' objects}
      3     0.049    0.016    0.414    0.138 __init__.py:1(<module>)
      1     0.257    0.257    0.295    0.295 example.py:26(forest)
      1     0.000    0.000    0.249    0.249 __init__.py:51(<module>)
      1     0.249    0.249    0.249    0.249 final_mdp.py:30(<module>)
      1     0.002    0.002    0.247    0.247 __init__.py:106(<module>)
      1     0.000    0.000    0.223    0.223 add_newdocs.py:10(<module>)
      1     0.000    0.000    0.201    0.201 type_check.py:3(<module>)
```

States = 2000, Actions = 2, n = 20

1688574 function calls (1688447 primitive calls) in 2201.834 seconds

Ordered by: cumulative time

| ncalls | tottime | percall | cumtime | percall | filename:lineno(function) |
|---------------|----------|---------|----------|----------|---|
| 1 | 0.001 | 0.001 | 2201.834 | 2201.834 | vi.py:3(<module>) |
| 1 | 0.003 | 0.003 | 2168.908 | 2168.908 | vi.py:57(run) |
| 63 | 42.671 | 0.677 | 2168.886 | 34.427 | final_mdp.py:219(_bellmanOperator_mpi) |
| 384047 | 2150.436 | 0.006 | 2150.436 | 0.006 | {numpy.core.multiarray.array} |
| 126000 | 4.223 | 0.000 | 2124.887 | 0.017 | final_mdp.py:263(myfunc_mpi) |
| 1 | 0.037 | 0.037 | 32.790 | 32.790 | vi.py:25(_boundIter) |
| 1 | 0.059 | 0.059 | 32.730 | 32.730 | final_mdp.py:281(_bellmanOperator) |
| 2000 | 0.714 | 0.000 | 32.654 | 0.016 | final_mdp.py:318(myfunc) |
| 256000 | 1.873 | 0.000 | 1.873 | 0.000 | {method 'dot' of 'numpy.ndarray' objects} |
| 256002 | 0.952 | 0.000 | 0.952 | 0.000 | {method 'reshape' of 'numpy.ndarray' objects} |
| 128000 | 0.323 | 0.000 | 0.466 | 0.000 | fromnumeric.py:501(transpose) |
| 128000 | 0.144 | 0.000 | 0.144 | 0.000 | {method 'transpose' of 'numpy.ndarray' objects} |
| 257519 | 0.133 | 0.000 | 0.133 | 0.000 | {method 'append' of 'list' objects} |
| 3 | 0.013 | 0.004 | 0.095 | 0.032 | __init__.py:1(<module>) |
| 129297/129273 | 0.088 | 0.000 | 0.088 | 0.000 | {len} |
| 1 | 0.002 | 0.002 | 0.072 | 0.072 | __init__.py:106(<module>) |
| 1 | 0.000 | 0.000 | 0.055 | 0.055 | add_newdocs.py:10(<module>) |
| 1 | 0.000 | 0.000 | 0.043 | 0.043 | type_check.py:3(<module>) |
| 1 | 0.026 | 0.026 | 0.030 | 0.030 | example.py:26(forest) |
| 2217 | 0.024 | 0.000 | 0.024 | 0.000 | {method 'reduce' of 'numpy.ufunc' objects} |
| 2064 | 0.002 | 0.000 | 0.018 | 0.000 | {method 'min' of 'numpy.ndarray' objects} |
| 2064 | 0.001 | 0.000 | 0.016 | 0.000 | methods.py:28(<module>) |

States = 2000, Actions = 2, n = 50

82552 function calls (82425 primitive calls) in 3655.979 seconds

Ordered by: cumulative time

| ncalls | tottime | percall | cumtime | percall | filename:lineno(function) |
|--------|----------|---------|----------|----------|---|
| 1 | 0.459 | 0.459 | 3655.979 | 3655.979 | vi.py:3(<module>) |
| 13601 | 3185.376 | 0.234 | 3185.376 | 0.234 | {numpy.core.multiarray.array} |
| 1 | 0.058 | 0.058 | 2076.066 | 2076.066 | vi.py:58(run) |
| 63 | 47.080 | 0.747 | 1776.972 | 28.206 | final_mdp.py:219(_bellmanOperator_mpi) |
| 2520 | 2.823 | 0.001 | 1728.453 | 0.686 | final_mdp.py:263(myfunc_mpi) |
| 1 | 0.879 | 0.879 | 1569.008 | 1569.008 | vi.py:26(_boundIter) |
| 1 | 11.751 | 11.751 | 1567.453 | 1567.453 | final_mdp.py:281(_bellmanOperator) |
| 2000 | 84.300 | 0.042 | 1555.016 | 0.778 | final_mdp.py:318(myfunc) |
| 189 | 298.568 | 1.580 | 298.568 | 1.580 | {method 'bcast' of 'mpi4py.MPI.Comm' objects} |
| 9040 | 9.062 | 0.001 | 9.062 | 0.001 | {method 'dot' of 'numpy.ndarray' objects} |
| 3 | 1.734 | 0.578 | 7.670 | 2.557 | __init__.py:1(<module>) |
| 1 | 0.294 | 0.294 | 6.024 | 6.024 | __init__.py:106(<module>) |
| 1 | 0.038 | 0.038 | 4.504 | 4.504 | add_newdocs.py:10(<module>) |
| 1 | 0.025 | 0.025 | 3.098 | 3.098 | type_check.py:3(<module>) |
| 9042 | 3.057 | 0.000 | 3.057 | 0.000 | {method 'reshape' of 'numpy.ndarray' objects} |
| 1 | 0.047 | 0.047 | 1.647 | 1.647 | __init__.py:51(<module>) |
| 1 | 1.600 | 1.600 | 1.600 | 1.600 | final_mdp.py:30(<module>) |
| 1 | 0.110 | 0.110 | 1.425 | 1.425 | __init__.py:7(<module>) |
| 1 | 0.298 | 0.298 | 1.073 | 1.073 | __init__.py:204(<module>) |
| 1 | 0.914 | 0.914 | 0.998 | 0.998 | example.py:26(forest) |
| 1 | 0.070 | 0.070 | 0.914 | 0.914 | utils.py:4(<module>) |
| 1 | 0.106 | 0.106 | 0.797 | 0.797 | tempfile.py:18(<module>) |

Grid Problem

States = 16, Actions = 4, n = 1

```
start time: 1462429091.99
rank is :0this is v: [ 6.60087167  7.70811489  8.88338231 10.14802807  5.93771312
 6.96219668  7.91213443  8.88338231  4.997      7.02070453
 7.91213443  8.88338231  5.52539987  7.7967387   8.88338231
10.14802807]
rank is :0this is policy: [ 2.  2.  2.  2.  2.  2.  2.  3.  3.  2.  2.  0.  2.  2.  2.  0.]
end time: 1462429092.0
      35775 function calls (34813 primitive calls) in 0.127 seconds

Ordered by: cumulative time

ncalls  tottime  percall  cumtime  percall filename:lineno(function)
   1    0.001    0.001    0.127    0.127 vi.py:3(<module>)
   3    0.012    0.004    0.088    0.029 __init__.py:1(<module>)
   1    0.002    0.002    0.068    0.068 __init__.py:106(<module>)
   1    0.001    0.001    0.052    0.052 add_newdocs.py:10(<module>)
   1    0.000    0.000    0.039    0.039 type_check.py:3(<module>)
  34    0.000    0.000    0.023    0.001 re.py:230(_compile)
  24    0.000    0.000    0.023    0.001 sre_compile.py:567(compile)
  23    0.000    0.000    0.023    0.001 re.py:192(compile)
   1    0.000    0.000    0.021    0.021 vi.py:142(gridproblem)
   2    0.000    0.000    0.021    0.010 npyio.py:257(load)
   2    0.000    0.000    0.020    0.010 format.py:593(read_array)
   2    0.000    0.000    0.020    0.010 format.py:464(_read_array_header)
   2    0.000    0.000    0.019    0.010 format.py:426(_filter_header)
```

States = 16, Actions = 4, n = 4

```
rank is :0this is v: [ 6.60087167  7.70811489  8.88338231 10.14802807  5.93771312
 6.96219668  7.91213443  8.88338231  4.997      7.02070453
 7.91213443  8.88338231  5.52539987  7.7967387   8.88338231
10.14802807]
rank is :0this is policy: [ 2.  2.  2.  2.  2.  2.  2.  3.  3.  2.  2.  0.  2.  2.  2.  0.]
end time: 1462429168.38
      31438      31438 function calls (30476 primitive calls) function calls in 0.251 seconds

Ordered by: cumulative time

ncalls  tottime  percall  cumtime  percall filename:lineno(function)
   3    0.007    0.002    0.288    0.096 __init__.py:1(<module>)
   1    0.001    0.001    0.251    0.251 vi.py:3(<module>)
   1    0.011    0.002    0.002    0.174 __init__.py:106(<module>)
   1    0.001    0.001    0.155    0.155 add_newdocs.py:10(<module>)
   1    0.000    0.000    0.136    0.136 type_check.py:3(<module>)
   1    0.001    0.001    0.061    0.061 __init__.py:7(<module>)
   1    0.005    0.005    0.032    0.032 _internal.py:6(<module>)
   2    0.002    0.001    0.031    0.016 __init__.py:45(<module>)
   1    0.001    0.001    0.030    0.030 utils.py:4(<module>)
  34    0.001    0.305    0.000    0.102 re.py:230(_compile)
  23    0.000    0.000    0.025    0.001 re.py:192(compile)
  24    0.000    0.000    0.025    0.001 sre_compile.py:567(compile)
   1    0.022    0.022    0.025    0.025 numeric.py:1(<module>)
```