

**NAME**

qnetdp – Computes the average cost per hour for a multiclass queueing or stochastic processing network control problem using a dynamic program.

**SYNOPSIS**

**qnetdp** [*OPTIONS*] *INPUT*

**DESCRIPTION**

Given a stochastic processing network control problem and several dynamic programming control parameters, this program uses value iteration to compute the average cost per hour. Truncation is used to limit the size of the state space.

The file *INPUT* must contain the network description in the format specified by **SPNetwork**(5) and **TaggedValues**(3).

**OPTIONS**

- h, --save-differential-cost=FILE**  
save computed differential cost to *FILE*.
- p, --save-policy=FILE**  
save computed policy to *FILE*.
- q, --quiet**  
minimize output.
- v, --verbose**  
show additional information.
- version**  
display program version.
- help** display usage information.

**EXAMPLE**

The following example is a two server, three class "U network" where the entry and exit classes are served by one server with an intermediate class that is served by a second server. Deterministic routing is used. Suppose the input file *u3.ini* contains the following lines:

```
# 3 class, 2 server U network

# Number of classes and servers
classes = 3
servers = 2

# Arrival rates into each class
# unspecified values default to zero
# format is lambda(<class>) = <rate>
lambda(1) = 0.1429

# Service rates of each server for each class
# unspecified values default to zero
# format is mu(<server>,<class>) = <rate>
mu(1,1) = 0.3492
mu(2,2) = 0.1587
mu(1,3) = 0.3492

# Holding costs per job per unit time at each class
# format is c(<class>) = <cost per job per unit time>
c(1) = 1.0
c(2) = 2.0
```

```

c(3) = 1.5

# Successor class of each class (deterministic routing)
# 0 to exit system, unspecified values default to zero
# format is s(<class>) = <successor class>
s(1) = 2
s(2) = 3
s(3) = 0 # exit

# Truncations
# required only if truncation is used to limit constraints
# format is N(<class>) = <truncation>
N(1) = 40
N(2) = 20
N(3) = 20

# DP parameters
epsilon = 0.0001
maxIter = 50000

```

then

```
qnetdp u3.ini
```

will produce output similar to:

```

---- Parameters -----

Network type: Multiclass Queueing
Number of classes: 3
Number of servers: 2 (pool sizes: 1 1)

class          =          1          2          3
-----
arrival rates = 0.1429          0          0
holding costs =          1          2          1.5
successor class=          2          3          0
assigned server=          1          2          1

service rates:
      class:          1          2          3
server:-----
  1 |          0.3492          0 0.3492
  2 |          0 0.1587          0

Total arrival rate: 0.1429
Total event rate:   0.6508
Truncations: N = 40 20 20
epsilon = 0.0001
maxIter = 50000

---- Solving -----

Solution found in 98.61 seconds

```

Number of iterations: 8803  
Average cost per stage: 27.8782  
Average cost per hour: 18.1431

**SEE ALSO**

**TaggedValues(3), SPNetwork(5)**

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