

Package: Opportunistic (via r-universe)

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Type Package

Title Routing Distribution, Broadcasts, Transmissions and Receptions
in an Opportunistic Network

Version 1.2.1

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Description Computes the routing distribution, the expectation of the
number of broadcasts, transmissions and receptions considering
an Opportunistic transport model. It provides theoretical
results and also estimated values based on Monte Carlo
simulations.

License GPL (>= 2)

Suggests hopbyhop, endtoend

NeedsCompilation no

Repository <https://chedgala.r-universe.dev>

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Expected	<i>Theoretical broadcasts/transmissions/receptions for an Opportunistic model</i>
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Description

This function computes the probability of success and the expected values of the number of broadcasts, transmissions and receptions for an Opportunistic model.

Usage

Expected(p)

Arguments

p vector of probabilities of length N where N represents the number of hops

Value

A matrix with the probabilities and expected values for an Opportunistic model for all hops sizes $\leq N$

Author(s)

Christian E. Galarza and Jonathan M. Olate

References

Biswas, S., & Morris, R. (2004). Opportunistic routing in multi-hop wireless networks. ACM SIGCOMM Computer Communication Review, 34(1), 69-74.

See Also

[routes](#), [MonteCarlo](#)

Examples

```
#An N=3 Opportunistic system with probabilities p = c(0.9,0.4,0.1)
res1 = Expected(p=c(0.9,0.4,0.1))
res1
```

MonteCarlo	<i>Monte Carlo broadcasts/transmissions/receptions for an Opportunistic model</i>
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Description

This function estimates via Monte Carlo the probability of success and the expected values of the number of broadcasts, transmissions and receptions for an Opportunistic model.

Usage

```
MonteCarlo(p, M = 10^4)
```

Arguments

p	vector of probabilities of length N where N represents the number of hops
M	Total number of Monte Carlo simulations

Details

N is computed from p length. M is 10⁴ by default.

Value

A vector with the success probability and expected values (broadcast, transmissions and receptions) for an N Opportunistic model.

Author(s)

Christian E. Galarza and Jonathan M. Olate

References

Biswas, S., & Morris, R. (2004). Opportunistic routing in multi-hop wireless networks. ACM SIGCOMM Computer Communication Review, 34(1), 69-74.

See Also

[routes](#), [Expected](#)

Examples

```
#Monte Carlo simulation for an N=3 Opportunistic system with probabilities
#p = c(0.9,0.4,0.1)

res2 = MonteCarlo(p=c(0.9,0.4,0.1),M=1000)
res2
```

```
#Larger simulation
res3 = MonteCarlo(p=c(0.9,0.4,0.1),M=10^4)
res3
```

routes

Routing distribution for an Opportunistic network

Description

It provides the different possible routes, their frequency as well as their respective probabilities when considering uncertain probabilities lying on a interval $p \pm \text{delta}$.

Usage

```
routes(p, delta = 0)
```

Arguments

p	vector of probabilities of length N where N represents the number of hops
delta	Delta value when considering uncertain probabilities. The interval is of the type $p \pm \text{delta}$.

Details

By default, delta is considered to be zero disregarding uncertainty.

Value

A data frame containing the routes, frequencies, and respective probabilities.

Author(s)

Christian E. Galarza and Jonathan M. Olate

See Also

[Expected](#), [MonteCarlo](#)

Examples

```
#An N=4 Opportunistic system with probabilities p1 = 0.7,...,p4 = 0.1
p = seq(0.7, 0.1, length.out = 4)
routes(p)
```

```
#An N=7 Opportunistic system
p = seq(0.7, 0.1, length.out = 7)
routes(p)
```

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