Package ‘endtoend’

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Type Package

Title Transmissions and Receptions in an End to End Network

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Author Christian E. Galarza, Jonathan M. Olate

Maintainer Christian E. Galarza <cgalarza88@gmail.com>

Description Computes the expectation of the number of transmissions and receptions considering an End-to-End transport model with limited number of retransmissions per packet. It provides theoretical results and also estimated values based on Monte Carlo simulations. It is also possible to consider random data and ACK probabilities.

License GPL (>= 2)

Imports pastecs, ggplot2

Suggests hopbyhop, Opportunistic

NeedsCompilation no

Repository CRAN

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Theoretical transmissions/receptions for a L-limited End to End model

Description

This function computes the expected value of the number of transmissions/receptions for End to End model with L-limited retransmissions per packet.

Usage

ETE(p1, p2, L, N)

Arguments

- p1: Data success probability
- p2: ACK success probability
- L: Maximum number of retransmissions.
- N: Number of Hops

Details

When there is no limitation, L value must be set as L=Inf.

Value

The output is a matrix containing the following values:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Success Probability</td>
</tr>
<tr>
<td>2</td>
<td>Expected Data Transmissions</td>
</tr>
<tr>
<td>3</td>
<td>Expected ACK Transmissions</td>
</tr>
<tr>
<td>4</td>
<td>Expected Total Transmissions</td>
</tr>
<tr>
<td>5</td>
<td>Expected Data Receptions</td>
</tr>
<tr>
<td>6</td>
<td>Expected ACK Receptions</td>
</tr>
<tr>
<td>7</td>
<td>Expected Total Receptions</td>
</tr>
</tbody>
</table>

Author(s)

Christian E. Galarza and Jonathan M. Olate

References


MCETE

See Also

MCETE, stochastic_ETE

Examples

# An N=5 End to End system with limited L=7 retransmission per hop
ETE(p1=0.65, p2=0.4, L=7, N=5)

# An unlimited N=5 End to End system
ETE(p1=0.65, p2=0.4, L=Inf, N=5)

Description

This function computes the mean of the number of transmissions/receptions for End to End model with L-limited retransmissions per packet simulating via Monte Carlo.

Usage

MCETE(p1, p2, L, N, M = 5000)

Arguments

- p1: Data success probability
- p2: ACK success probability
- L: Maximum number of retransmissions
- N: Number of Hops
- M: Number of Monte Carlo Simulations

Value

The output is a matrix containing the following values:

1. MC Success Probability
2. MC Mean Data Transmissions
3. MC Mean ACK Transmissions
4. MC Mean Total Transmissions
5. MC Mean Data Recections
6. MC Mean ACK Receptions
7. MC Mean Total Receptions
Author(s)
Christian E. Galarza and Jonathan M. Olate

References

See Also
ETE.stochastic_ETE

Examples
#Monte Carlo simulations for an N=5 End to End system
#with limited L=7 retransmission per hop
MCETE(p1=0.65,p2=0.4,L=7,N=5)

stochastic_ETE

Random Probabilities Monte Carlo transmissions/receptions simulations for a L-limited End to End model

Description
This function compute the mean of the number of transmissions/receptions for End to End model with L-limited retransmissions per packet simulating via Monte Carlo.

Usage
stochastic_ETE(dist1,p11,p12,dist2,p21,p22,L,N,M=10^5,printout=TRUE,plotspdf=TRUE)

Arguments

dist1 For the data success probability: probability density function. Options are "uniform" and "beta".
p11 For the data success probability: lower limit of the uniform distribution (dist1 == "uniform") or shape1 (alpha) paremeter of a Beta distribution (dist1 == "beta").
p12 For the data success probability: upper limit of the uniform distribution (dist1 == "uniform") or shape2 (beta) paremeter of a Beta distribution (dist1 == "beta").
dist2 For the ACK success probability: probability density function. Options are "uniform" and "beta".
For the ACK success probability: lower limit of the uniform distribution (dist1 == "uniform") or shape1 (alpha) parameter of a Beta distribution (dist1 == "beta").

For the ACK success probability: upper limit of the uniform distribution (dist1 == "uniform") or shape2 (beta) parameter of a Beta distribution (dist1 == "beta").

Maximum number of retransmissions

Number of Hops

Number of Monte Carlo Simulations

If TRUE (by default), the function prints some outputs and plots

If TRUE (by default), the function exports all plots in pdf in the working directory

The output is a matrix containing two elements:

data a dataframe containing all Monte Carlo replications
stats descriptive statistics

for

1 p1
2 p2
1 Success Probability
2 Expected Data Transmissions
3 Expected ACK Transmissions
4 Expected Total Transmissions
5 Expected Data Receptions
6 Expected ACK Receptions
7 Expected Total Receptions

Christian E. Galarza and Jonathan M. Olate


See Also

ETE, MCETE
Examples

# Monte Carlo simulations for an N=5 End to End system
# with limited L=7 retransmission per hop

# We now consider \( p_1 \sim \text{Uniform}(0.2,0.6) \)
dist1 = "uniform"
p11 = 0.2
p12 = 0.6

# and \( p_2 \sim \text{Beta}(3,1) \)
dist2 = "beta"
p21 = 3
p22 = 1

# no outputs and plots
out = stochastic_ETE(dist1,p11,p12,dist2,p21,p22,L=7,N=5,M=5*10^3,printout=FALSE,plotspdf=FALSE)

out$data # simulations
out$stats # resume

# uncomment next line for outputs plots and pdf file
# out = stochastic_ETE(dist1,p11,p12,dist2,p21,p22,L=7,N=5,M=5*10^3)
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