HKUSTx: ELEC1200.3x A System View of Communications: From Signals to Packets (Part 3)

Lab 1 Task 4 theoretical efficiency from lecture equation

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discussion posted about 18 hours ago by KarenWest

I have everything calculated correctly in Lab 1 Task 4 except for the theoretical efficiency from the lecture equation. Here is a code snip of only that section. Does anyone know what's wrong with my equation? Thanks.

```
p = p_list(pc);
if (p ~= 0) && (p~= 1) && (n_coll(pc) >= 1)
     exponentValue = n_coll(pc) - 1;
     exponentPart = (1 - p)^exponentValue;
     expeff_v(pc) = n_coll(pc) * p * exponentPart;
elseif (p == 0)
     expeff_v(pc) = 1;
elseif (p == 1)
     expeff_v(pc) = 0;
end
```

Related to: Topic 2: The Link Layer / 2.4 Efficiency of Slotted Aloha

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3 responses

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Elaktrona

about 14 hours ago

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N in the above expressions for computing expeff_v should be **n_users**, not n_coll(pc)

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PeterB001

about 14 hours ago

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Hi Karen,

Have a look at slide #5 of "ELEC1200_3x_Wk1_T2_L4_Efficiency_of_Slotted_Aloha.pdf". You can implement this in one line of code if you use the Element-wise operator (".").

In that formula what is "N"? - "N" is a constant.

Good luck

Add a comment

KarenWest

about 9 hours ago

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Thank you both for your responses and I will investigate my mistakes and your comments later today and post back here. I'm on snow clean up duty this morning! Easton (south of Boston,MA) only got about 8 inches, so nothing to clean up compared to NY City, Philadelphia and the Washington DC area. So I'll be back later! Thanks for your help.

I appreciate your comments that N is a constant, but I find I'm still confused with the formula, since I thought that N was the number of collisions for a given probability of successful transmission on slotted Aloha, not the total n_users number. PC is the index within the p_list of probabilities spaced apart in the list by 0.05 going from 0 to 1, so if n_coll(pc) is used, it's the number of collisions at that index during the transmission successes, failures, and empties that are counted for that probability iteration. Also, with the comment about using the "." to iterate over an array for an operator such as multiplication, I was not clear on how to use that here.

```
exponentValue = n_coll(pc) - 1;
exponentPart = (1 - p)^exponentValue;
expeff_v(pc) = n_coll(pc) * p * exponentPart;
```

could be written instead in one line as (??)-- sorry --not that experienced with MATLAB, although I have used the element-wise operator in past versions of this class (parts 1 and 2) occasionally:

```
expeff_v = n_coll .* p_list .* (1 - p_list).^(n_coll-1)
```

Any more help is appreciated! ;-) Thanks.

posted about 8 hours ago by KarenWest

Now apply Elaktrona's advice. The resulting (dashed) plot should track a previous curve calculated.

posted about 6 hours ago by _derrickb

Hey Karen, your one line formula is almost correct except two thing you have to fix. First ,like Elaktrona said, N represents the number of users (or nodes if you want) and not the number of collisions. Second, read Matlab documentation about element-wise matrix multiplication and multiplication of a matrix by a constant (that will tell the difference between the "." and multiplication of matrices). I hope it helps.

posted about 4 hours ago by Dondasse

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KarenWest

about an hour ago

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It's working now. Thanks for the help. I did not realize that n_users was the number of backlogged nodes. The lecture notes said N = number of backlogged nodes, so I thought that meant the number of collisions, n_coll for a given index (pc) for the probability in p_list. So that was the confusion I guess. Thanks for the advice to refresh my memory on element-wise multiplication of matrices.

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