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

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LAB 1 - TASK 4 (EXTERNAL RESOURCE) (1.0 points possible)

2.5 Lab 1: Link Layer
Lab due Jan 25, 2016 at 15:30 UTC

- MATLAB download and tutorials

LAB 1 - TASK 4

In this task, you will evaluate the performance of the slotted ALOHA protocol by investigating the ef changing the transmission probability **p** on the system efficiency by both simuation and analytically

INSTRUCTIONS

The initial MATLAB code in the window below is similar to code in Task 1. Some changes were mad up the simulation. In particular, each user always sends the same the frame. These frames are nov matrix that will be used to create the slots. The variable **slot** is still computed by the logical OR of a frames, although the code is slightly different.

The goal of this task is to study the performance of the ALOHA system as a function of the probabi that purpose, we created a list of probabilities, called **p_list**, and we added a for loop to test the sy these probabilities. For each value of **p_list**, we will store the efficiency of the system (variable **eff_** expected (theoretical) efficiency obtained by the equation studied in the lecture (variable **expeff_v** fraction of the total number of slots in the simulation (**n_slots**) that are empty (variable **empty_v**) contain collisions (variable **coll_v**). These fractions should vary between 0 and 1.

If you run the code, Fig. 1 will show the efficiency (simulated and analytical), the normalized numbe slots, and the normalized number of collision as a function of the probability **p**. In the initial code, th are always zero, but if you revise the code correctly, they will change with **p** and Fig.1 will illustrate probability **p** affects the performance of the ALOHA protocol. For example, when **p** is set to 1, we e fraction of collisions to be 1 and the fraction of empty slots to be zero because every user always tr the other hand, when **p** is set to 0, we expect there to be no collisions because all slots are empty.

Your task is to revise the code to compute the correct values of **eff_v**, **expeff_v**, **empty_v** and **n_** reminded that these variables are column vectors with lengths equal to length of **p_list**. Refer to th slides for the formula to calculate **expeff_v**.

Please revise the code between the lines

```
% % % % Revise the following code   % % % %
```

and

and

```
% % % % Do not change the code below % % % %
```

Do not change other parts of the code.

Your Solution

Reset MATLAB Documentation (https://www.mathworks.

```
53      total = n_succ(pc) + n_coll(pc) + n_empty(pc);
54      eff_v(pc)  = n_succ(pc) / total;
55      empty_v(pc) = n_empty(pc) / total;
56      coll_v(pc) = n_coll(pc) / total;
57      p = p_list(pc);
58      expeff_v(pc) = n_coll(pc) * p * (1 - p)^(n_coll(pc) - 1);
59  end
60
61
```

Assessment Tests: Failed

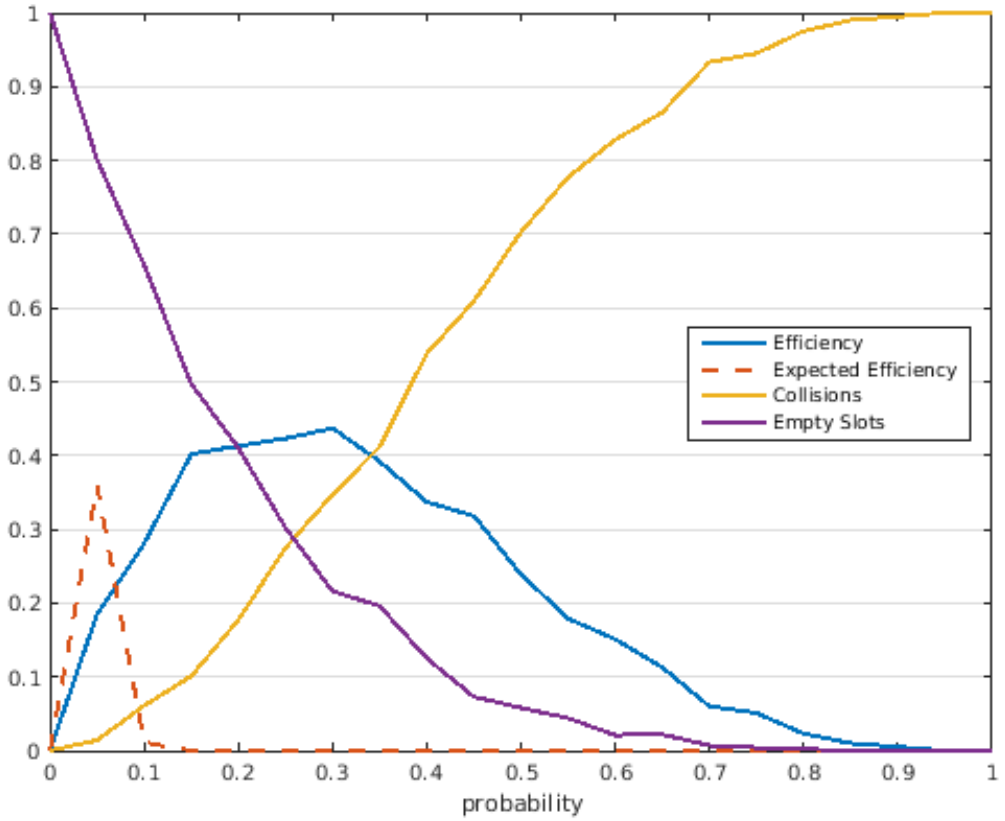
- ✔ Is problem setup unmodified?
- ✔ Is the efficiency correct?
- ✔ Is the normalized number of empty slots correct?
- ✔ Is the normalized number of collisions correct?
- ✘ Is the expected (theoretical) efficiency correct?

✗ Is the expected (theoretical) efficiency correct?

The value stored in the variable expeff_v is incorrect.

The theoretical efficiency is incorrect

Output

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