Stochastics
Problem sheet 11 - Statistics III: nonparametric tests
Fall 2021

1. A lake contains 3 species of fish: carp, tilapia and catfish. Otto, the old fisherman tells us that the lake contains twice as much tilapia as either carp or catfish. Based on a sample of 60 fish caught, decide on a 95% confidence level whether we should believe Otto or not.

carp	tilapia	catfish
11	35	14

2. A pack of candy contains red, blue and green candies. Test the hypothesis that their ratio inside the pack is equal against the hypothesis that their ratio is not equal on a 95% confidence level based on the following sample:

red	blue	green
23	15	22

3. We test the random number generator of a calculator. A sample of 1000 random numbers gave the following results:

$[0, 0.2]$	$[0.2, 0.4]$	$[0.4, 0.6]$	$[0.6, 0.8]$	$[0.8, 1]$
183	195	221	192	209

Based on the above sample, test on a 95% confidence level whether RNG produces a random number with distribution $U[0, 1]$ or not.

4. The color of people's hair in two populations is as follows:

	blond	brown	black	red
pop. A	142	208	106	44
pop. B	82	210	58	50

Test on a 95% confidence level whether the distribution of the hair color in the two populations is the same or not.

5. We are examining a certain type of crash helmets by color and level of protection. We have a sample of 1232 accidents where this type of helmet was involved.

	black	white	orange
no injury	501	367	31
minor injury	173	107	7
major injury	30	15	1

Accept or reject the hypothesis that the color of the helmet is independent from the level of protection provided on a 95% confidence level.

6. We examine the hair color and eye color in a population.

	blond	brown	black	red
blue	571	201	58	2
green	184	433	158	53
brown	81	660	458	4

Accept or reject the hypothesis that the hair color is independent from the eye color in this population.