

Nonparametric statistics: Practical session IV

1. A driver kept track of the number of miles he travelled and the number of gallons put in the tank each time she bought gasoline.

Miles: 142, 116, 194, 250, 88, 157, 255, 159, 43, 208

Gallons: 11.1, 5.7, 14.2, 15.8, 7.5, 12.5, 17.9, 8.8, 3.4, 15.2

- (a) Draw a scatter plot using above data with gallons on x-axis.
 - (b) Obtain Spearman's rank correlation as well as Kendall's tau.
 - (c) Fit a line of regression of miles on gallons.
 - (d) The car's mileage is estimated to be 18 miles per gallon. Test whether the data support this figure.
2. Ten companies reported their percent increase in advertising expenses, X, and their percent increase in sales, Y, for last year as compared with the previous year.

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|------------------|----|----|----|-----|----|----|----|----|----|----|
| Company: | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| X (advertising): | 4 | 62 | 31 | -11 | 47 | 88 | 16 | -1 | 74 | 21 |
| Y (sales): | 10 | 33 | 39 | -14 | 37 | 39 | 18 | -8 | 45 | 33 |

- (a) Draw a scatter plot. Interpret the plot (Does expected values of the percent increase in sales seem to be a linear function of the percent increase in advertising? A monotonic function?)
- (b) Estimate the expected percent increase in sales for a 25% increase in advertising.
- (c) Estimate the regression of Y on X. Plot the estimated regression curve on the same graph used in part (a).