**Test of Parameters Under Bivariate Normal Distribution**

1. Twelve cars were equipped with radial tires and driven over a test course. Then the same 12 cars (with the same drivers) were equipped with regular belted tires and driven over the same course. After each run, the cars’ gas economy (in km/l) was measured. Is there evidence that radial tires produce better fuel economy? (Assume normality of data, and use α = .05.)

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| **Car** | | | | | | | | | | | | |
| Gas Economy | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| X1 (radial) | 4.2 | 4.7 | 6.6 | 7.0 | 6.7 | 4.5 | 5.7 | 6.0 | 7.4 | 4.9 | 6.1 | 5.2 |
| X2 (Belted) | 4.1 | 4.9 | 6.2 | 6.9 | 6.8 | 4.4 | 5.7 | 5.8 | 6.9 | 4.7 | 6.0 | 4.9 |

1. A study is designed to check the relationship between smoking and longevity. A sample of 15 men 50 years and older was taken and the average number of cigarettes smoked per day and the age at death was recorded, as summarized in the following table. Can we conclude from the sample that longevity is independent of smoking?

[Data correlation](https://i2.wp.com/www.real-statistics.com/wp-content/uploads/2013/02/image1546.png)

1. For the above data, can the two variances be considered to be equal? Justify your answer.