

23 mars 2022

Series 5 : Analysis of the Menchutkin's experiment results

For the response K , the rate coefficient, which is a dimensionless factor influencing the reaction rate and given in the last column of table 1 :

1. Infer the coefficients for the three model analyse in the exercise of last week,
2. Compute the ANOVA tables for the three cases (`fitlm()`, `anova mdl`),
3. Compute the confidence intervals of the coefficients,
4. Confront the results of the inference with the analysis of the design.

TABLEAU 1 – Coefficients of induction σ_F , of resonance σ_R of 19 amines and reaction rates K obtained in the Menchutkin's reaction

| Run | Amines | σ_F | σ_R | K |
|-----|--------------|------------|------------|------|
| 1 | H | 0 | 0 | 4390 |
| 2 | t- C_4H_9 | 0 | -0.07 | 4180 |
| 3 | i- C_3H_7 | 0 | -0.07 | 4060 |
| 4 | C_2H_5 | 0 | -0.07 | 3950 |
| 5 | CH_3 | 0 | -0.08 | 3850 |
| 6 | CH_2OH | 0.14 | -0.06 | 3510 |
| 7 | C_6H_5 | 0.1 | -0.22 | 3350 |
| 8 | $CH=CH_2$ | 0.06 | -0.15 | 3260 |
| 9 | NH_2 | 0.14 | -0.52 | 2600 |
| 10 | $NHCH_3$ | 0.12 | -0.58 | 2520 |
| 11 | $N(CH_3)_2$ | 0.1 | -0.64 | 2250 |
| 12 | OH | 0.3 | -0.38 | 2110 |
| 13 | $CO_2C_2H_5$ | 0.31 | 0 | 2020 |
| 14 | OCH_3 | 0.28 | -0.42 | 1700 |
| 15 | Br | 0.45 | -0.15 | 1290 |
| 16 | Cl | 0.45 | -0.17 | 1230 |
| 17 | F | 0.44 | -0.25 | 1060 |
| 18 | CN | 0.6 | 0 | 1000 |
| 19 | NO_2 | 0.65 | 0 | 660 |