Корреляционно-регрессионный анализ связи

Задание: Используя раннее изученные инструменты анализа «Корреляция» и «Регрессия» выявить связь между прочностью горных пород на одноосное сжатие (МПа) и содержанием породообразующих минералов (%): кварца, плагиоклаза, полевого шпата, роговой обманки, размером минеральных зерен (мм) и их площадью ($мм^2$), соотношением сторон, коэффициентом формы для 30 образцов.

Имена переменных: номер образца, прочность на одноосное сжатие (МПа), кварц (%), плагиоклаз (%), полевой шпат (%), роговая обманка (%), размер зерен (мм), площадь зерен ($мм^2$), соотношение сторон, коэффициент формы.

Набор данных (источник: E. Ali, W. Guang, A. Ibrahim. Empirical Relations Between Compressive Strength and Microfabric Properties of Amphibolites Using Multivariate Regression, Fuzzy Inference, and Neural Networks: A Comparative Study. Engineering Geology. 2014. Vol. 183. Pp. 230-240.):

1,100.6,40.3,9.98,17.01,21.57,0.031,754.4,0.594,0.63

2,112,47.1,8.5,15,23,0.025,490.6,0.612,0.612

3,117.5,45.4,9.1,16.2,24,0.022,379.9,0.628,0.628

4,100.9,41.3,7.72,11.02,18.86,0.044,1519.8,0.571,0.667

5,94.5,33.8,4.1,14,16,0.043,1451.5,0.575,0.662

6,91.5,37.2,7.4,12,13,0.046,1661.1,0.499,0.663

7,97.5,40,5.44,11.21,10.52,0.035,961.6,0.606,0.685

8,100,39.1,5.1,10.9,8.5,0.032,803.8,0.585,0.683

9,108.5,44.2,5,12,14.8,0.032,803.8,0.615,0.68

10,87,35.1,5.51,13.41,14.87,0.056,2462,0.572,0.639

11,78,26.6,8,14,10.5,0.054,2289.1,0.549,0.636

12,92.9,29.7,6.8,11,13,0.052,2122.6,0.604,0.68

13,111.7,37,7.52,15.6,30.96,0.021,346.2,0.652,0.673

14,114,33.2,6.6,13,25,0.02,314,0.652,0.671

15,104.5,39.2,5.2,14.7,27.3,0.018,254.3,0.663,0.67

16,118,37.1,7.19,15.69,25.58,0.017,226.9,0.651,0.675

17,116.5,39.5,5.8,16,20.5,0.019,283.4,0.65,0.678

18,115,40.8,6.9,15.1,26,0.022,379.9,0.57,0.669

19,103.9,39,4.23,9.29,12,0.038,1133.5,0.635,0.681

20,110.2,43.7,6.5,8.7,15,0.032,1163.8,0.652,0.68

21,100.2,35.4,5.2,9.6,9.5,0.039,1193.9,0.635,0.675

22,105,46.8,8.18,10.11,12.81,0.043,1451.5,0.603,0.67

23,110,42.9,10.2,11,19.5,0.038,1133.5,0.622,0.674

24,110,45.7,13,11.3,17,0.036,1017.3,0.649,0.67

25,101,42,12.5,10,3.89,0.039,1194,0.603,0.636

26,94.4,37.1,11,11.2,6.3,0.038,1133.5,0.602,0.636

27,118,38.1,9.88,14,27,0.025,490.6,0.698,0.621

28,119,40.6,12,10,25.5,0.021,346.2,0.67,0.621

29,112,53,11.5,11.3,23.3,0.029,660.2,0.63,0.623

30,123,38.9,12.8,16.5,24.3,0.024,452.2,0.68,0.62