Problem B：钢铁烧结混料加水量预测数学建模

Problem description: The sintering of iron and steel industry is to mix iron ore, flux and fuel in a certain proportion, then add a proper amount of water and sinter on the sintering machine. In sintering, water not only affects the quality of sinter, but also affects the production efficiency. Therefore, water is one of the important causes that affect the sintering of iron and steel industry.

This Problem is based on the following article. (See details in the attached pdf files) Yushan Jiang, Ning Yang, Qingqi Yao, et al. Real-time moisture control in sintering process using offline online narx neural networks. Neurocomputing, 396: 209–215, 2020.

Questions include the following:

• According to the data in the attachment txt files, make statistical description and preprocessing of data including but not limited to feature selection, extraction, normalization etc.

• Establish a time series model to predict the moisture content in a mixture. Explain the architecture of the basic model and specific methods for improving the model.

• Establish a moisture control model and explain specific control methods and processes. And give model simulation results to show the efficiency of the control method.

Your PDF solution of no more than 25 total pages should include:

• One-page Summary Sheet.

• Table of Contents.

• Your complete solution.

• References list.

• AI Use Report (If used does not count in the 25-page limit.)

Note:

You may use up to 25 total pages for all your solution work and any additional information you want to include (for example: drawings, diagrams, calculations, tables).

We permit the careful use of AI such as ChatGPT, although it is not necessary to create a solution to this problem.

If you choose to utilize a generative AI, this will result in an additional AI use report that you must add to the end of your PDF solution file. And it does not count in the 25 total page limit for your solution.