**Problem B: Data Driven Sintering Moisture Control**

Sinter is the main raw material for blast furnace iron making. To provide high quality sinter, the moisture content of the mixture in the sintering need to be in the best range. **However, most of the sintering is still artificial water adding which leads to a great variation in the moisture content of the mixture**.

Iron ore sintering includes six steps (See Fig. 1): proportioning, mixing, ignition, breaking, cooling and screening. First, in the proportioning, these materials blend in proportion to form the raw mix. The silos store different kinds of iron ore, limestone, dolomite, lime, coke, blast furnace ash, dust removal and returned sinter. Second, in the mixing part, there are two mixers. The first mixing drum adds water to the raw mix and sends it to the second one. The second mixing is aimed at granulating. When the mixture falls on the conveyor belt, the moisture meter above the belt measures the water content. In step 3, a roller feeder carries out the mixture on the sinter machine. As the sinter trolley moving to the end, it reaches the sintering terminal and the sintering ends. In step 4, the sinter cake is broken up in a sinter breaker. Step 5 is sinter cooling. Finally, in the screen part, the qualified sinter is sent to the blast furnace. And the undersized sinter is sent back to the proportioning part as returned sinter.



Fig. 1 Typical sintering process in iron and steel industry

With the attachment file data (See Data.xlsx), the boss of the steel plant asked you to design an automatic control model of sintering moisture. The following are some requirements:

1. Dealing with the data, finding the relationship between the moisture content of the raw mix and different materials.

2. With analysis of the data, establish data driven moisture control algorithm(model).

3. Analyze your model and explain how your model is better than adding water manually.