Optimal feeding trajectory for an industrial sugar mill cogeneration plant

Wanwisa Skolpap, author

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Abstrak

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Using an optimum dynamic scheduling plan, the formulated problem aimed to maximise daily profitability from an existing 12. 5 MW bagasse-based cogeneration plant with a steam capacity of 125 tonne/ h used for sugar refining. The optimal bagasse feed rate yielded a maximum daily profit of 838.49 USD (base case), about 5.14% higher than the conservative constant feeding bagasse into the existing plant. A sensitivity analysis of daily profit was constructed by perturbating the fuel low heating value (LHV), electricity selling rate of electric utility (p) and cost of electricity generation (c) . The maximum daily profit was insensitive to increases in LHV until this LHV was 11% lower than its base case value, which resulted in a decrease in maximum daily profit by 11%. Excessive moisture in the bagasse and the cost of generating electricity (c) caused lower profits, whereas the price of electricity (p) increased profits.