

A heuristic methodology to improve the automatic operation system of air separation process in steel industry

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Cryogenic air separation units (ASUs) are used for producing gaseous high-purity oxygen in steel industry. As the oxygen demand fluctuates frequently and significantly, the operating conditions of ASUs should be switched rapidly and automatically for reducing released oxygen, consequently for saving the power consumption. Although recent researches have reported model predictive control methods in the automatic operation system, alternative economic method should be developed. Simple heuristic approaches could be improved the existing distributed control system: parameter tuning by linear regression with plant data, balanced synchronization between intermediate and final operating target values. Case studies were conducted that comparing the operator and automatic algorithm for switching operating conditions of varying 15% oxygen production rate. Power consumptions were reduced to 1.4%p for increasing case and 2.4%p for decreasing one.