

Measuring process capability index C_{pmk} with fuzzy data and compare it with other fuzzy process capability indices

ABSTRACT

The index C_{pmk} is a well-known loss-based process capability index. It can reveal more information about the location of the process mean compared with other classic process capability indices. This index is also more sensitive than other capability indices to any deviations from process mean. When there are some uncertainties in observations, fuzzy logic can be employed to manage these uncertainties. There is some research on different fuzzy process capability indices and this paper is an extension of Tsai and Chen (2006), Chen, Lin, and Chen (2003) for the process capability index C_{pmk} of fuzzy numbers. In order to find the membership function of process capability index C_{pmk} , the α -cuts of the fuzzy observation were employed. An example of fuzzy process capability C_{pmk} calculator was illustrated and compared with other classic fuzzy process capability indices $C_p, C_{pl}, C_{pu}, C_{pk}$ and C_{pm} . Results showed that fuzzy C_{pmk} has the advantages of both C_{pk} and C_{pm} . Since the index C_{pmk} is a more sensitive index compared with other classic indices, the fuzzy process capability index C_{pmk} can be a more sensitive fuzzy index compared with $C_p, C_{pl}, C_{pu}, C_{pk}$ and C_{pm} .

Keyword: Fuzzy data; Fuzzy process capability indices; Index C_{pmk} ; Process capability indices