

Fault detection in stochastic dynamical systems is usually carried out by the generation of residuals directly reflecting the magnitude of the faults. For this purpose, faults indicator is used to evaluate possible deviations from the normal operating conditions and the measurements of the system. This evaluation is often very difficult to implement in the multi-faults case. This article aims to demonstrate the efficiency of the coefficient of variation (CV) in detecting single and multi-faults in a multivariable laboratory three tank system DTS-200. The performance of the detection algorithm is based on the computation of the confidence intervals (CIs) which provide an estimate of the amount of error in the considered data and characterise the precision of the computed statistical estimates. The data variability may result from random measurement errors caused by the system parameters uncertainties, internal and external noises, and measuring instrument, which are not usually accurate. The CIs make the CV less sensitive to parameter uncertainties and to measure noises. The robustness and accuracy of the CV are shown in a healthy mode and various faulty situations in an entirely uncertain environment