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## Signed sequential rank CUSUMs

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CUSUMs based on the signed sequential ranks of observations are developed for detecting location and scale changes in symmetric distributions. The CUSUMs are distribution-free and fully self-starting: given a specified in-control median and nominal in-control average run length, no parametric specification of the underlying distribution is required in order to find the correct control limits. If the underlying distribution is normal with unknown variance, a CUSUM based on the Van der Waerden signed rank score produces out-of-control average run lengths that are commensurate with those produced by the standard CUSUM for a normal distribution with known variance. For heavier tailed distributions, use of a CUSUM based on the Wilcoxon signed rank score is indicated. The methodology is illustrated by application to real data from an industrial environment.

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