

## **Abstract**

Investment risk in stocks is one of the things that need to be considered by investors. Therefore investors need to develop strategies to manage portfolios. One way to manage risk in stock investments is to diversify the portfolio by selecting stocks. In this paper, stocks in a portfolio are chosen based on the similarity of the price movement data through the clustering using K-means. Since stocks in the same cluster have a higher similarity compared to shares in different clusters, the portfolio consists of stocks selected in each different cluster. Stock price movements are high dimensional data, requiring computation costs during clustering, so the dimension reduction is applied by conducting an interpolation using B-Spline. Based on the weekly dataset in 10 years (01/01/2009 - 12/31/2018), the Mean-Variance and the Equal-Weight portfolio consists of the selected stocks using this approach offer less volatility, higher Sharpe Index, and better cumulative performance.

**Keywords:** portfolio, b-spline, clustering, KOMPAS 100, mean-variance, equal-weight;