Abstract: We consider determining the optimal stopping time for the glue curing of wood panels in an automatic process environment. From a near-infrared spectrum probe, we collect a time series of curves consisting of 72 spectra and aim to detect an optimal stopping time. Using the NIR spectroscopy technology to monitor the manufacturing process ensures substantial savings in energy and time. We propose an estimation procedure to determine the optimal stopping time of wood panel compression, along with estimation uncertainty associated with the estimated stopping time. Our method iteratively computes forward and backward integrated squared forecast errors based on the testing sample by dividing the entire data sample into a training sample and a testing sample. We then apply a structural break detection method with one breakpoint to determine an estimated optimal stopping time for the time series of the forward and backwards integrated squared forecast errors. By taking the maximum of the two breakpoints, we obtain our final estimate of the optimal stopping time.

Key words: covariance function; functional principal component analysis; integrated squared forecast error; structural change; wood panel NIR spectra