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Censored Bernstein quantile networks for probabilistic precipitation forecasting

John Bjørnar Bremnes
Norwegian Meteorological Institute, Oslo, Norway (j.b.bremnes@met.no)

In recent years neural networks have successfully been applied to probabilistic post-processing of numerical weather prediction forecasts. In the Bernstein Quantile Networks (BQN) method predictive quantile distributions are specified by Bernstein polynomials and their coefficients linked to input features through flexible neural networks. However, precipitation presents an additional challenge due to its mixed distributed nature with a considerable proportion of dry events for short accumulation periods. In this presentation, it is demonstrated how the BQN method can be modified to mixed distributed variables like precipitation by introducing a latent variable and treating zero precipitation cases as censored data. The method is tested on both synthetic and real precipitation forecast data and compared to an approach where a model of the probability of precipitation is combined with a model of precipitation amounts using the laws of probability.