A gene–wavelet model for long lead time drought forecasting
7. Conclusions

In this study, the LGP and wavelet transform concepts were combined to develop an explicit hybrid gene–wavelet model, WLGP for long LT drought forecasting using PMDI and NINO 3.4 values as predictors and forthcoming PMDI index as a predictand. The model is capable: (i) to obtain the average wavelet spectra, (ii) to detect the significant spectral bands (iii) to forecast future PMDI, and (iv) to optimize the number of significant spectral bands via its heuristics-based sensitivity analysis feature. The application of the WLGP across the State of Texas provided significant improvement in accuracy over the ad hoc LGP models particularly at 6 and 12-month LT forecasting. Sensitivity analysis among input variable bands indicated that the preceding values of PMDI have higher impact than NINO 3.4 for drought forecasting up to 6-month LT, whereas the latter has high potential to forecast drought for 6 through 12-month LT.