

## **Label Propagation Method for Catchment Classification in Australia**

### **ABSTRACT**

Catchment classification has been one of the most important study in hydrology. There are many reasons of catchment classification studies has been done but most importantly, is for prediction of ungauged basin (PUB), among other purposes. There exist numerous approaches for classification, with different bases and assumptions, which have been applied for catchment classification. The concepts of complex networks, and particularly community structure, have emerged as important tools for classification, and are currently gaining attention in catchment classification. Therefore, in this present study, the community structure method particularly label propagation method, which every node is denoted with a unique label and at every step, each node adopts the label that most of its neighbors currently have. Then, densely connected groups of nodes form a consensus on a unique label iteratively to form communities. A network of 218 monthly streamflow stations across Australia are considered for catchment classification using the proposed method. The influence of correlation thresholds that exhibit the strength of connection between the stream flows which range from 0 to 1 is also examined. Hence, there are four threshold values are selected ( $T = 0.65, 0.7, 0.75$  and  $0.8$ ) and the communities formed with each selected threshold value are interpreted. The results also reveal that communities identified from Australia stream flows using label propagation are best represent using threshold value of  $0.8$ , based on the region boundaries.