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Stars: Testing method for regime shifts detection

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Research focusing on regime shift in marine time series has increased in the last decade. Last year alone, there were 140 published papers and 5500 citations within the literature. One commonly used method to detect shifts in physical and ecological time series is the sequential t-test analysis of regime shift (STARS). This method has a convenient Visual Basic Application (for Excel) and therefore is widely used by marine ecologists. In this work, we analyse, using simulated data, the limitations and accuracy of the STARS method for identifying threshold points in time series. We synthesized two groups of time series generated with the program R, each one consisting of 1000 different random series containing known change points and magnitude values. The two groups are as follows: 1) 1000 random time series without autocorrelation, and, 2) 1000 random time series with incorporated autocorrelation and seasonality. Then, all-time series are analysed using the STARS method, utilizing a CRAN-package in R that replicates Rodionov's program. The work is still in progress; however the first results indicate that there are inaccuracies in STARS in determining the exact timing of change points. The aim of this work is to provide researchers with useful indications on the limits this method for detecting regime shifts and to provide an R routine accessible for all researchers.

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The diffusion of information and behavior in social networks: Renewable energy technology adoption in rural China

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Adopting renewable energy technologies has been seen as a promising way to reduce CO2 emissions and address climate change. This paper investigates how social networks may affect renewable energy technology adoption. We distinguish two channels through which social networks may play a role: (i) the diffusion of information; and (ii) the diffusion of behavior. Most empirical studies fail to quantitatively separate the diffusion of information and behavior in social networks. We conduct a survey on biogas technology adoption in rural China to identify individuals' egocentric information networks. In egocentric social networks, the individual of interest is defined as "ego" and the people connected to the ego are defined as "alters". We find that both the diffusion of information and behavior drive farmers' technology adoption. Farmers with larger egocentric information networks and a larger fraction of known adopters are more likely to adopt the biogas technology. In addition, we collect data on several attributes of alters to explore the composition of social networks. We find heterogeneous social network effects across different types of alter. Alters who have close relationships with egos such as friends and relatives or that are trusted by egos affect egos' adoption through the diffusion of information, while less trusted alters such as government officials affect egos' adoption through their adoption behavior.

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