

Hidden Markov Models, the Viterbi Algorithm, and the Business Cycle

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Use of the E-M algorithm for estimation in hidden Markov models (HMMs) is reviewed, two particular algorithms, a greedy algorithm and the Viterbi algorithm, being mentioned for the E step. Quarterly GDP over several decades is studied. The first difference of log quarterly GDP (the continuous growth rate) is considered as a velocity of the economy; the second difference, as an acceleration. These two are treated as realizations of hidden Markov processes and analyzed. The series is segmented into four states, which may be considered as recession, recovery, expansion, and contraction. Questions of whether, for example, three states might suffice are considered with model-selection criteria.