The economic speed of an oceangoing vessel in a dynamic setting

The optimal (economic) speed of oceangoing vessels has become of increased importance due to the combined effect of low freight rates and volatile bunker prices. We examine the problem for vessels operating in the spot market in a tramp mode. In the case of known freight rates between origin destination combinations, a dynamic programming formulation can be applied to determine both the optimal speed and the optimal voyage sequence. Analogous results are derived for random freight rates of known distributions. In the case of independent rates the economic speed depends on fuel price and the expected freight rate, but is independent of the revenue of the particular voyage. For freight rates that depend on a state of the market Markovian random variable, economic speed depends on the market state as well, with increased speed corresponding to good states of the market. The dynamic programming equations in our models differ from those of Markovian decision processes so we develop modifications of standard solution methods, and apply them to small examples.

General information
State: Published
Organisations: Department of Management Engineering, Athens University of Economics and Business
Contributors: Magirou, E. F., Psaraftis, H. N., Bouritas, T.
Number of pages: 20
Pages: 48-67
Publication date: 2015
Peer-reviewed: Yes