

## Abstract

**Amerongen, J. van and A.J. Udink ten Cate, "Model reference adaptive autopilots for ships",** *Automatica*, vol. 11, Pergamon Press, pp. 441-449, 1975

For control purposes the steering characteristics of a ship at constant thrustpower can be described by a relatively simple mathematical model. The dynamic behaviour of the ship and hence also the parameters of this model are dependent on the external circumstances and the applied thrustpower. When the ship is steered with an autopilot it is necessary to adjust the parameters of the autopilot dependent on the change of the steering characteristics of the ship. The easiest way to do this is to adapt automatically the parameters of the autopilot. In this paper two methods of adaptation are compared. First a description is given of an autopilot, synthesized according to the 'sensitivity model' approach, especially designed to prevent the course instability which can occur for very large ships. Second a method of adaptation known as the stability (Liapunov) approach is used. By simulation with the model of a ship of 2000 brt, a comparison is made between the two methods. The results were tested in practice on this ship. During the measurements at sea special attention was paid to the problem of filtering the disturbances due to yawing.