

ABSTRACT

System LORAN (Long Range Navigation) is a radio navigation system that uses radio wave propagation properties on the surface of the earth (groundwave). LORAN operates on low frequency, ie 90 to 110 kHz. LORAN-C (LORAN-Conventional) consists of several separate chain at a certain distance. Each chain consists of at least one master station and two secondary stations. Each station will send a pulse on a continuous basis at intervals to the recipient. The first station is the master sends pulses, followed by respective secondary differences in the pulse arrival time between the master and the user each secondary plus the amount of delay to reach the master station of each secondary is called Time Difference (TD). In modeling the propagation channel LORAN system that will be made, the distance between stations will be affected quite a lot and some noise-noise, among other forms of the earth's surface irregularities, interference with other signals, reflected from the objects around, etc.. Noises will cause errors on the LORAN signal received at the user from heterogen of propagation velocity, the effects of crossing angles, the gradient, and fix ambiguity. TD result in users experiencing errors or called Time Difference Error (TDE), causing the user positioning is not accurate.

At the end of this task design and simulate an algorithm to minimize errors in the TD. The algorithm is Kalman Filter, which is an algorithm thatTDE update), and can control the inputs are inconsistent (error) with the linear-quadratic regulator (LQR) which is owned by the Kalman filter. This algorithm is simulated with Matlab 2009.

The simulation results show that the parameter estimator of Kalman filter algorithm affect the results of the control system. So it is necessary that the parameter estimator in accordance with the application system, and produces maximum results. With estimator time process noise parameters: 15, time measurement noise: 0.05, LPA (initial): 0 ns to minimize the value of TDE for between -25 ns - 20 ns and the cumulative value of TDE for -10 ns - 30 ns with the total of LPA will add to the transmitter is -1520 ns.

Key word: loran, *time difference*, *time difference error*, *groundwave*, filter kalman