Underwater Investigations and Robotics. 2020. No. 3 (33). P. 31–35.

COMPENSATION OF THE EFFECTS OF SOUND PROPAGATION CHANNEL

IN UNDERWATER ACOUSTIC SYSTEMS

**Pakhomov S.A., Shostak S.V.**

3 test center of the military unit 09703

690080, Vladivostok, st. Basargin, 22. Ph .: +7 (423) 263-82-77.

E-mail: pifagors@bk.ru, servash@mail.ru

**ABSTRACT**

The state of the underwater acoustic channel depends on a variety of random factors of the media. Estimation of the influence of such channel on the transmitting signal can be performed by the method of linear filtration. It consid-ers channel as a linear non­variant system with additive Gaussian noise, where the relation between input and out-put signals is described by impulse response. The necessary condition of efficient implementation of this method is the selection of valid input signals and estimation of the weight coefficient of the implemented system, which was per-formed using Gauss–Markov theorem in the present work. Following the results of solving the problem, the minimum variance unbiased estimates were obtained, including the case of using the pseudorandom sequence as an input sig-nal. At long last, the paper presents the method of channel influence compensation with consideration of known im-pulse response, which allows reducing the level of the noise component.

**Key words:** underwater acoustic channel, weight co-efficients, dispersion, minimum variance unbiased estimate, pseudorandom sequence, impulse response.

**REFERENCES**

1. Tolstoy I., Kley K.S. *Akustika okeana*. *Teoriya i eksperiment v podvodnoy akustike*. M.: *Mir*, 1969. 301 p.

2. Uidrou B., Stirnz S. *Adaptivnaya obrabotka signalov*. M.: *Radio i svyaz*', 1989. 440 p.

3. Anderson T*. Statisticheskiy analiz vremennykh ryadov*. M.: *Mir*, 1976. 756 p.

4. Rao S.R. *Lineynye statisticheskie metody i ikh primeneniya*. M.: *Nauka*, 1968. 548 p.

5. Rabiner L., Gould B. *Teoriya i primenenie tsifrovoy obrabotki* *signalov*. M.: *Mir*, 1978. 848 p.

6. Kuk I., Bernfel'd M. *Radiolokatsionnye signaly*. M.: *Sov. radio*, 1971. 568 p.

7. Pakhomov S.A., Shostak S.V. *Identifikatsiya gidroakusticheskogo kanala peredachi   
// Strategicheskaya stabil'nost'*. 2020. Vol. 1 (90). P. 56–59.

8. Oppengeym A., Shafer R. *Tsifrovaya obrabotka signalov*. M.: *Svyaz'*, 1979. 416 p.

9. Tsypkin Ya.Z. *Osnovy teorii obuchayushchikhsya sistem*. M.: *Nauka*, 1970. 252 p.