4:40

2pAO8. Analysis of the neuro-fuzzy classifiers for fish species identification from acoustic echoes. Andrzej Stepnowski, Dung Tran Van, and Joanna Maciolowska (Tech. Univ. of Gdansk, Acoust. Dept., 80-952 Gdansk, Poland, astep@pg.gda.pl)

Some of the variety of classification methods have been recently implemented also for fish species identification from their acoustic echoes. The classification systems employing artificial neural networks and fuzzy logic separately are not satisfactory, so the combined neuro-fuzzy approach were carried out. A couple of neuro-fuzzy classifiers were built and tested using the NEFCLASS program, which discovered the rules and found the shape of membership functions for determining correct class categories for a given input data set. The systems were tested on fish echoes acquired by DT4000 digital echo sounder. The results are promising with reference to the classifiers performance and their generalization abilities.

5:00

2pAO9. Improving echograms' resolution by wideband pulse compression and dynamic focusing. Manell E. Zakharia (CPE Lyon, LASSSO (LISA, EP92 CNRS), 43 Bd. du 11 Novembre 1918, BP 2077, Bat. 308, F 69616, Villeurbanne Cedex, France)

Improving the resolution of fisheries' sounder echograms (i.e., reducing the confusion volume) can be achieved by improving either the axial or the angular resolution. On one hand, the range (i.e., time) resolution can be improved without any degradation of the signal-to-noise ratio by using frequency-modulated signals associated with pulse compression. Axial resolution can be considerably enhanced by using wideband signals. On the other hand, due to the angular spreading of the sonar beam, the lateral resolution is proportional to the range. Improving the angular resolution can only be achieved by using a larger array (only possible on the receiving side). Nevertheless, such a solution has a severe limitation as it reduces the volumes sampled at short range, leading to an angular undersampling of the biomass. Dynamic focusing can be used to overcome this problem. Its principle is simple: the shorter the range, the smaller the array (i.e., the larger the angular aperture). The use of such a technique needs a compromise between the acceptable beam divergence and the system complexity. Both techniques will be applied to real data and echograms will be displayed and compared to the ones obtained with a standard system.

5:20

2pAO10. Bergen acoustic buoy (BAB)—A tool for remote monitoring of marine resources. Olav Rune Godo and Atle Totland (Inst. of Marine Res., P.O. Box 1870, 5024 Bergen, Norway)

Marine resource abundance monitoring is often accomplished by means of research vessel acoustic surveys. Vessel time is limited and expensive, and optimal and cost-efficient utilization is required. Such vessels have clear limitations in observing the true acoustic distribution, density, and acoustic properties of marine organisms due to noise and light emitted during surveying and sampling. A potential solution to some of the emerging problems is a remote operated acoustic device, which can be used to monitor distribution, density, movements, and properties of marine organisms under natural and survey vessel affected conditions. In this paper a new concept for a remote operated acoustic data logger is presented which can give an online presentation of the acoustic information. The system is built on the new Simrad General Purpose Transceiver (GPT) operated through a standard windows NT interface. The technical specification and operational features will be presented and exemplified with experience from the first sea trials. The system is designed to meet demands from other applications, e.g., a drop sonde and towed underwater function, and future development of the concept is discussed.

5:40

2pAO11. Design of a transducer-driving system scanning around an aquatic target in an indoor tank. Ken Ishii, Tsuyoshi Okumura, Kouichi Sawada, and Yoichi Miyanohana (Natl. Res. Inst. of Fisheries Eng., Ebidai Hasaki, Kashima, Ibaraki, 314-0421 Japan)

A squid has been specified as a kind of fish that has to been managed scientifically. Estimation of its resources via acoustic surveys is required. But the basic data of the target strength (TS) of a squid are limited. So far, in the measurements of the TS pattern of fish, echo levels are observed while changing the aspect of a fish. On the other hand, since a squid is more fragile than a fish, and unstable in shape, the rotating unit of fish is not available for a squid. So the positioning system that makes a transducer scan precisely around an aquatic target suspended in the water has been designed. This system is loaded in the electric flatcar, the probe of which can move three dimensionally, on the top of a tank which is 10 m in width, 15 m in length, and 10 m in depth. It is hoped that precise TS pattern measurements are possible so that the target is suspended without damage owing to this transducer-driving system. The detail of control software and an example of measurements and subjects are described in this paper.