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# Based- Knowledge Block Lattice Filters for an MTI System

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This paper researches adaptive Stagger-Block-Lattice-Filter (SBLF) processor, which can be applied to an MTI radar. Our years' experiments prove the necessity to incorporate AI into the processor. Only algorithmic operation largely restricts clutter suppression performance in complex environments. The high speed and small radar-cross-section of a target compel an MTI to be upgraded by stagger PRI (Pulse Repetition Interval), PC (Pulse Compression) transmissions, and intelligent operation. Five heuristic strategies for knowledge-based adaptive SBLF processor are proposed

1) Non-clutter block decision and threshold set-up, which decides whether the Test block to be dominated by a clutter and uses the filtering-itself output to set up detection thresholds.
2) Target block identification and terrace-indication declaration, which identifies the Test block to be dominated by a target or not and determines PC terrace-indication.
3) SBLF coefficient estimation, which calculates SBLF coefficients in the Guard I block in real-time.
4) Establishment of clutter-map, which stores the thresholds, target block index, terrace-indication index, SBLF coefficients and notch parameters in the corresponding map cells.
5) Guidance of stagger PRI, which collects target block indices from adjacent bearings and notch parameters to assist target extraction and to suggest the available PRI.

In order to verify the effectiveness of the above intelligent operations, we do a lot experiments with computer and select a ship-borne radar as the background; the clutter returns feature the land, sea and weather environments and target returns feature weak high-speed aircrafts. No matter in homogeneous or in heterogeneous clutters, this processor demonstrates the ability to extract the weak aircrafts in the strong clutter.