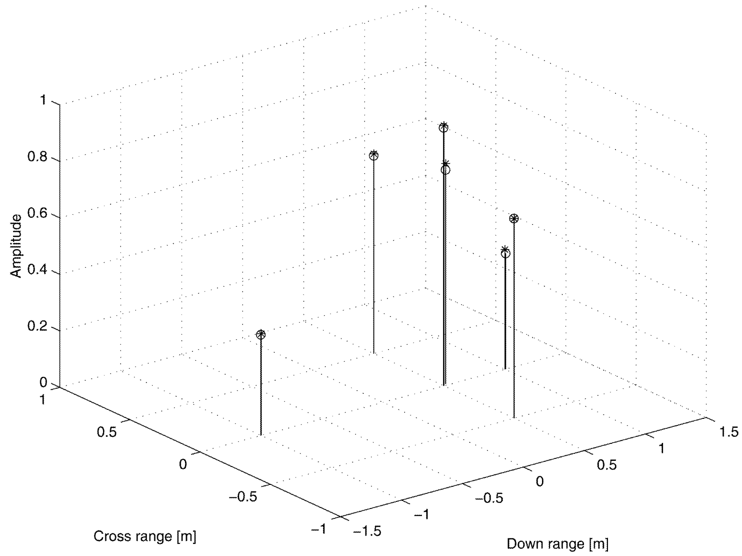

Fig. 10. Extracted scattering centers by 2-D EP-based CLEAN (○) and actual scattering centers (∗) using data of Table V, $M = 128$, $N = 61$, $P = 6$, noise-free.

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Errata: Search Radar Detection and Track with the Hough Transform[1]

Part I: System Concept (pages 102–108)

The matrix, H, defined in (4) has the columns reversed. The cosines should be in the first column and the sines should be in the second column. This switch is required since the H matrix pre-multiplies the D matrix in (5) to represent the transform defined in equation (1).

Part II: Detection Statistics (pages 109–115)

A second error occurs in (18) where the average per cell probability of false alarm is erroneously given by

$$P_{\mathrm{F}} = \frac{1 - \prod_{N=1}^{N_{\max}} (1 - {}^{N}P_{\mathrm{F}})^{w_N}}{\sum_{N=1}^{N_{\max}} w_N},$$

where ${}^{N}P_{\mathrm{F}}$ is the notation used for the per cell probability of false alarm for an accessible Hough accumulator cell having N range-time cells contributing to its amplitude. Equation (16) of the

[1] Carlson, B. D., Evans, E. D., and Wilson, S. L., *IEEE Transactions on Aerospace and Electronic Systems*, **30**, 1 (Jan. 1994), 102–125.

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0018-9251/03/$17.00

paper gives the formula for this quantity. The symbol w_N is the number of accessible Hough accumulator cells having the value N. This is clearly incorrect since it is the division of a probability by a constant which does not produce a probability. Further, the limit as ${}^{N}P_{\mathrm{F}} \to 1$ is clearly *not* unity which is incorrect.

The correct way to compare theory to simulation is to observe that the simulations produce an experimental number for the expected number of final threshold crossings (meaning the final threshold which in the paper is denoted by the lower case Greek letter ξ). Let C_i be the number of threshold crossings obtained on simulation run i and let N_{sim} be the total number of simulation runs done for a given value of the secondary threshold ξ i.e., we are beginning the calculation of a single point on the curve in Fig. 2. The expected number of threshold crossings, defined by

$$N_{\text{crossings}} = E[\text{number of threshold crossings}]$$

is calculated for the simulation case as

$$N_{\text{crossings}} = \frac{\sum_{i=1}^{N_{\mathrm{sim}}} C_i}{N_{\mathrm{sim}}}.$$

To calculate the same quantity theoretically we let w_N be the number of accessible Hough space accumulator cells having the number of contributing range-time cells equal to N and we let ${}^{N}P_{\mathrm{F}}$ be as described above. Then we have

$$N_{\text{crossings}} = \sum_{N=1}^{N_{\max}} w_N \, {}^{N}P_{\mathrm{F}},$$

where $N_{\max}$ is the highest point of the accessible Hough space.

Both of these expressions, the one for the simulations and the theoretical one, are converted to an "average per cell probability of false alarm" by dividing by the total number of accessible Hough space accumulator cells given by

$$N_{\text{total cells}} = \sum_{N=1}^{N_{\max}} w_N = 13{,}166.$$

Thus the two quantities we are comparing in Fig. 2 are

$$\text{(Theory)} \quad P_{\mathrm{F}} = \frac{\sum_{N=1}^{N_{\max}} w_N \, {}^{N}P_{\mathrm{F}}}{N_{\text{total cells}}}$$

$$\text{(Simulation)} \quad P_{\mathrm{F}} = \frac{\sum_{N=1}^{N_{\mathrm{sim}}} C_i}{N_{\mathrm{sim}} N_{\text{total cells}}}.$$

Note that the theoretical result goes to the correct limits for the two cases ${}^{N}P_{\mathrm{F}} \to 0$ and ${}^{N}P_{\mathrm{F}} \to 1$. These are the two expressions which were compared in Fig. 2 which showed the correct results. The authors apologize for any confusion the above error may have caused.

The authors would like the thank Guo-Hong Wang and WuFu He of the Nanjing Research Institute of Electronics Technology for pointing out this latter error.