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Editorial

In Apologiam—rules of the game and plagiarism

Publicly available scientific knowledge results from the accumulated work of all researchers sharing their ideas and results with others. This edifice is enormous but it is made up of small units each one of us contributes. To fit one new piece into the knowledge base, two main conditions must be fulfilled. First, the contribution must be new, and second, it must be evaluated by peer review. The novelty is mainly the responsibility of the contributor. The state-of-the-art must be known and the added value must be clearly presented. Evaluation is in the hands of editors. They rely on a large team of experts who assess the proposal, check the novelty, possibly suggest improvements, or reject. The whole process is based on mutual trust and confidence. Whenever it is broken, the case does not help the offender at all.

In theory, the rules are simple. In practice, although not perfect, all in all, the system has worked quite well for a very long time. Occasionally, we do face problems in applying these conditions, as individual interpretations, local, national or continental conditions may vary. Although collaborative, the process quite naturally involves competition. The number of publications in a curriculum vitae still plays a non-negligible role when applying for a job or going through an evaluation. The new-comers need to be well trained with respect to publishing. They should all realize that paying proper credit to the state-of-the-art does not take away any value of their work, provided that it has some originality. Excellence leads to notoriety, but the converse is not true. What counts is the integral of a person's contributions. One may fool some of the people some of the time, but not all of the people all of the time. Developing amnesia with respect to published work cannot be tolerated. Even worse are cases of kleptomania leading to plagiarism. Those who suffer from kleptomania should realize that it is very serious, with severe consequences for their career. One of the basic goals of peer review is to check the originality of contributions. For various reasons, the process is unfortunately not fraud-proof. A plagiarism going through unnoticed happily occurs only very rarely.

We regret to inform our readers that, for the first time in the 24-year long history of our journal, such a case has come to light. The paper by M.B. El Mashade, entitled "Postdetection integration analysis of the excision CFAR radar target detection technique in homogenous and nonhomogenous environments", published in Vol. 81, the November 2001 issue of our journal, on pp. 2267–2284, contains a considerable number of instances of plagiarism with respect to the original papers by H. Goldman and I. Bar-David, "Analysis and Applications of the Excision CFAR Detector", IEE Proceedings, Part F, December 1988, pp. 563–575, and by H. Goldman, "Performance of the Excision CFAR Detector in the Presence of Interferers", IEE Proceedings, Part F, June 1990, pp. 163–171, as listed below.

We herewith offer, together with our referees, our sincerest apologies to Dr. H. Goldman, to Professor I. Bar-David, and to our readers for not detecting this very unfortunate case during the review procedure.

The following instances of plagiarism have been compiled by Dr. H. Goldman to whom we offer our heartfelt thanks.

Instance No. 1

The text in Section 1, "*Introduction*" *of the paper by Goldman* [1, p. 163] *reads*:

> The excision operation ensures that the calculation of the detection threshold is based on a set of samples which is purged of strong interferers and is therefore much more representative of the noise level.

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The text in the "Abstract" of the paper by El Mashade [3, p. 2267] *reads*:

The excision operation ensures that the calculation of the detection threshold is based on a set of samples which is purged of strong interferers and is therefore much more representative of the noise level.

Instance No. 2

The text in the "Abstract" of the paper by Goldman [1, p. 163] *reads*:

It is found that the detectability loss of the detector in a benign environment is very low and that the degradation in performance caused by interferers is quite small even if the number of interferers is large.

The text in the "Abstract" of the paper by El Mashade [3, p. 2267] *reads*:

It is found that the processor detectability loss, in homogenous background, is very low and that the performance degradation, caused by interferers is quite small even if the number of interferers is large.

Instance No. 3

The text in Section 1, "*Introduction*", *of the paper by Goldman and Bar-David* [2, p. 563] *reads*:

Each of the modified CFAR techniques has its advantages and disadvantages with the performance depending on the actual statistics of the noise, the interferences and the amplitude fluctuations. In the presence of interference, the censoring technique based on rank statistics [2] is not satisfactory if the number of interfering samples exceeds the number of samples which the censoring processor can handle.

The text in Section 1, "*Introduction*", *of the paper by El Mashade* [3, p. 2268] *reads*:

Each of the modified CFAR techniques has its advantages and disadvantages with the performance depending on the actual statistics of the noise, the interferences and the amplitude fluctuations. In the presence of interference, the censoring technique based on rank statistics is not satisfactory if the number of interfering samples exceeds the number of samples which the censoring processor can handle.

Instance No. 4

The text in Section 1, "*Introduction*", *of the paper by Goldman* [1, p. 163] *reads*:

In this detector, strong samples that exceed an excision threshold are excised from the sample set prior to the cell-averaging operation. The excision operation ensures that the calculation of the detection threshold is based on a set of samples which is purged of strong interferers and is therefore much more representative of the noise level. Even if the excisor fails to excise all interferers, it excises the largest amongst them, leaving only those below the excision threshold. If the excision threshold is properly set, the impact of the remaining interferers should be tolerable. In the excision CFAR detector, interferers that exceed the excision threshold do not influence the value of the detection threshold but, as long as the excision threshold is sufficiently high so as not to excise also too many of the noise peaks, fluctuations in the noise power properly influence the detection threshold.

The text in Section 1, "*Introduction*", *of the paper by El Mashade* [3, p. 2268] *reads*:

The excision detector alleviates this problem by excising strong samples that exceed an excision threshold from the sample set prior to the cell averaging operation. The excision operation ensures that the calculation of the detection threshold is based on a set of samples which is purged of strong interferers and is therefore much more representative of the noise level. Even if the excisor fails to excise all interferers, it excises the largest amongst them, leaving only those below the excision threshold. If the excision threshold is properly set, the impact of the remaining interferers should be tolerable. On the other hand, if the excision threshold is sufficiently high so as not to excise many of the noise peaks, fluctuations in the noise power properly influence the detection threshold [2, 5].

Note: While the text of the above paragraph has been copied verbatim from the original paper, the offender added two references. The second reference [5] is a paper by the offender published in “Signal Processing” in 1997.

Instance No. 5

The text in Section 2.1, “*Structure of the excision CFAR detector*”, *of the paper by Goldman* [1, p. 163] *reads*:

> A set of K samples, called the sample set, is used for estimation of the noise power. We assume that the sample tested for detection is excluded from this set and thus ensure that the threshold computed by the detector is independent of the tested sample.

The text in Section 2.1, “*Detector structure*”, *of the paper by El Mashade* [3, p. 2269] *reads*:

> A set of N samples, called the sample set, is used for the noise level estimation. It is assumed that the sample tested for detection is excluded from this set and thus ensures that the threshold computed by the detector is independent of the tested sample.

Instance No. 6

The text in Section 2.1, “*Structure of the excision CFAR detector*”, *of the paper by Goldman* [1, p. 163] *reads*:

> The sample set, denoted in Fig. 1 by $\{x_i\}$, is applied to an excisor which nullifies any sample that exceeds a predetermined excision threshold B_{E}. The set of ‘surviving’ samples $\{y_i\}$ at the excisor’s output is averaged with only the nonzero samples considered. The average value of the samples V is multiplied by a predetermined detection coefficient D and the result B_{D} is used as a detection threshold. A sample that exceeds the detection threshold is declared to be detected.

The text in Section 2.1, “*Detector structure*”, *of the paper by El Mashade* [3, p. 2269] *reads*:

> The sample set is applied to an excisor which nullifies any sample that exceeds a predetermined excision threshold T_{E}. The set of surviving samples at the excisor’s output averaged with only the nonzero samples that are considered. The average value of the samples is multiplied by a predetermined detection coefficient and the result is used as a detection threshold. A sample that exceeds the detection threshold is declared to be detected.

Instance No. 7

The text in Section 2.1, “*Signal model*”, *of the paper by Goldman and Bar-David* [2, p. 564] *reads*:

> The excision CFAR detector is designed to detect signals in the presence of broadband noise and various strong interferers while keeping a constant false alarm rate.

The text in Section 2.2, “*Signal model*”, *of the paper by El Mashade* [3, p. 2269] *reads*:

> The excision CFAR detector is designed to detect signals in the presence of broadband noise and various strong interferers while keeping a constant false alarm rate (CFAR).

Instance No. 8

The text in Section 2.1, “*Signal model*”, *of the paper by Goldman and Bar-David* [2, p. 564] *reads*:

> In addition to the legitimate signals, interfering signals originating from wideband jamming noise, jamming pulses and unintentional interferences can be expected.

The text in Section 2.2, “*Signal model*”, *of the paper by El Mashade* [3, p. 2269] *reads*:

> In addition to the legitimate signals, interfering signals originating from wideband jamming noise, jamming pulses and unintentional interferences can be expected.

Instance No. 9

The text in Section 2.1, “*Signal model*”, *of the paper by Goldman and Bar-David* [2, p. 564] *reads*:

> The detector is indented to detect all the legitimate signals present in an interval called a window, with the detection of weak signals not to be hampered by

the possible presence of strong pulses in the same window.

The text in Section 2.2, "*Signal model*", *of the paper by El Mashade* [3, p. 2269] *reads*:

The detector is indented to detect all the legitimate signals present in an interval called a window, with the detection of weak signals unhampered by the possible presence of strong pulses in the same window.

Instance No. 10

The text in Section 2.2, "*Signal model*", *of the paper by Goldman* [1, p. 164] *reads*:

We assume that the noise at the input to the detector is a Gaussian narrowband process. Each noise sample at the output of the square-law device is therefore a random variable with an exponential probability density function (PDF) [4]:

$$f_X(x) = (1/2\sigma^2)\exp(-x/2\sigma^2), \quad x \geqslant 0, \tag{1}$$

where σ^2 is the noise power.

The signal at the input to the detector is assumed to be a sine wave with the phase uniformly distributed over $[0, 2\pi]$ and the amplitude A distributed with a Rayleigh PDF:

$$f_A(a) = (a/A_S^2)\exp(-a^2/2A_S^2), \quad a \geqslant 0. \tag{2}$$

This model of a fluctuating signal is widely accepted in the radar literature for describing a signal returning from a complex target consisting of many independent scatterers of approximately equal echoing areas. The present model is usually referred to as Swerling Case 1 [3] while the nonfluctuating model discussed in Ref. [1] is referred to Swerling Case 0. In the analysis of communications links, fluctuations of the amplitude of the received signal with a Rayleigh PDF is frequently used as a model for a fading channel [13].

Conditioned on the value of the amplitude, each sample Z that originates from a signal at the input to the detector is a random variable with a noncentral chi-square PDF [4]:

$$f_Z(z/A) = \frac{1}{2\sigma^2}\exp\left(-\frac{z+A^2}{2\sigma^2}\right) I_0\left(\frac{A\sqrt{z}}{\sigma^2}\right), \quad z \geqslant 0 \tag{3}$$

where $I_0(\ )$ stands for the modified Bessel function of the first kind and of order zero.

The text in Section 2.2, "*Signal model*", *of the paper by El Mashade* [3, p. 2269] *reads*:

We assume that the noise at the detector input is a Gaussian narrowband process. Each noise sample at the output of the envelope detector is therefore a random variable with an exponential probability density function (PDF)

$$f_X(x) = (1/2\sigma^2)\exp(-x/2\sigma^2)U(x), \tag{1}$$

where σ^2 is the noise power, and $U(x)$ denotes the input-step function.

The signal at the input to the detector is assumed to be a sine wave with the phase uniformly distributed over phase, over $[0, 2\pi]$, and a Rayleigh distributed amplitude A, with PDF

$$f_A(a) = (a/A_S^2)\exp(-a^2/2A_S^2)U(a). \tag{2}$$

In the above expression, A_S represents the signal power. This model of a fluctuating signal is widely accepted in the radar literature for describing a signal returning from a complex target consisting of many independent scatterers of approximately equal echoing areas. On the other hand, fluctuations of the amplitude of the received signal with a Rayleigh PDF is frequently used as a model for a fading channel.

Conditioned on the value of the amplitude, each sample y that originates from a signal at the input to the detector is a random variable with a noncentral chi-square PDF:

$$f_y(y/A) = \frac{1}{2\sigma^2}\exp\left(-\frac{y+A_S^2}{2\sigma^2}\right) I_0\left(\frac{A\sqrt{y}}{\sigma^2}\right) U(y) \tag{3}$$

where $I_0(\ )$ stands for the modified Bessel function of the first kind and of order zero.

Instance No. 11

The text in Section 3, "*Performance of the excision CFAR detector in a benign environment*", *of the paper by Goldman* [1, p. 164] *reads*:

A benign environment in the present context is defined as an environment of additive Gaussian noise and possibly additive broadband jamming that can also be modelled as Gaussian.

The text in Section 3.1, "*Detector performance in homogenous background*" *of the paper by El Mashade* [3, p. 2272] *reads*:

A homogenous environment in the present context is defined as an environment of additive Gaussian noise and possibly additive broadband jamming that can also be modeled as Gaussian.

Instance No. 12

The text in Section 3 *of the paper by Goldman and Bar-David* [2, p. 565] *reads*:

The samples pass through an excisor, the operation of which is mathematically defined by

The text in Section 3.1 *of the paper by El Mashade* [3, p. 2273] *reads*:

These samples pass through an excisor of threshold T_E, the operation of which is mathematically defined as

Instance No. 13

The text in Section 3 *of the paper by Goldman and Bar-David* [2, p. 565] *reads*:

A sample Y that was not excised is a random variable with a PDF given by

$$f_Y(y) = f_X(y \mid X \leqslant B_\mathrm{E}). \tag{6}$$

The text in Section 3.1 *of the paper by El Mashade* [3, p. 2273] *reads*:

A sample v that was not excised is a random variable with a PDF given by

$$f_v(u) = f_y(u \mid y \leqslant T_\mathrm{E}). \tag{23}$$

Instance No. 14

The text in Section 3 *of the paper by Goldman and Bar-David* [2, p. 565] *reads*:

where α is the excision coefficient defined by

$$\alpha = \frac{B_\mathrm{E}}{2\sigma^2}. \tag{7}$$

It is seen from Eq. (6) that the PDF of Y is the PDF of X truncated at the excision threshold B_E and properly normalized.

The text in Section 3.1 *of the paper by El Mashade* [3, p. 2273] *reads*:

where $\alpha = T_\mathrm{E}/2\sigma^2$ is the excision coefficient. It is seen, from Eq. (23), that the PDF of v is the PDF of y truncated at the excision threshold T_E and properly normalized.

Instance No. 15

The text in Section 3 *of the paper by Goldman and Bar-David* [2, p. 565] *reads*:

the probability that K_P nonzero samples remains after the excision operation is

$$q(K_\mathrm{P}) = \binom{K}{K_\mathrm{P}} P_\mathrm{E}^{K_\mathrm{P}}(1 - P_\mathrm{E})^{K-K_\mathrm{P}}. \tag{11}$$

After the excisor, the sample mean V of the noise is calculated, with only the surviving nonzero samples being considered

$$V = \frac{1}{K_\mathrm{P}} \sum_{i=1}^{K_\mathrm{P}} Y_i, \quad K_\mathrm{P} > 0. \tag{12}$$

$K_\mathrm{P} = 0$ implies that no samples survived the excisor and therefore the detection test is suspended. The probability that n is zero is $\exp(-\alpha K)$. Thus, the effective detection probability is decreased by a factor of $[1 \exp(-\alpha K)]$. Since this decrease is negligible even for the smallest realistic values of α and K, we may assume in Eq. (12) that $K_\mathrm{P} > 0$ and subsequently ignore the possibility that K_P is zero.

The text in Section 3.1 *of the paper by El Mashade* [3, p. 2273] *reads*:

the probability that n out of N nonzero samples remains after the excision operation has the following expression:

$$P_n(n) = \binom{N}{n} P_{Et}^{n}(1 - P_{Et})^{N-n}. \tag{25}$$

After the excisor, the sample mean Z of the noise is calculated, with only the surviving nonzero samples being considered, according to

$$Z = \frac{1}{n}\sum_{k=1}^{n} y_k. \tag{26}$$

$n = 0$ implies that no samples survived the excisor and therefore the detection test is suspended. The probability that n is zero is $\exp(-\alpha N)$. Thus, the effective detection probability is decreased by a factor of $[1 \exp(-\alpha N)]$. Since this decrease is negligible even for the smallest realistic values of α and N, the probability that n is zero can be neglected.

Instance No. 16

The text in Section 3 *of the paper by Goldman and Bar-David* [2, p. 566] *reads*:

To obtain a constant false alarm rate, we set the detection threshold B_D to be a multiple of the sample mean V, i.e.,

$$B_D = \gamma_D V, \tag{15}$$

where γ_D is the detection coefficient. Since V is a random variable, so is the threshold B_D, and its expected value is

The text in Section 3.1 *of the paper by El Mashade* [3, p. 2273] *reads*:

To obtain a constant false alarm rate, we set the detection threshold T_r to be a multiple of the sample mean Z; $T_r = TZ$, as we previously described. Since Z is a random variable, the detection threshold will also be a random variable with an expected value given by

Instance No. 17

The text in Section 3 *of the paper by Goldman and Bar-David* [2, p. 566] *reads*:

Operation without excision is obtained from the previous results by letting $\alpha \to \infty$. With $\alpha \to \infty$ we have

$$\begin{aligned} &h = 1,\\ &P_E = 1,\\ &K_P = K,\\ &E\{B_D\} = 2\sigma^2\gamma_D. \end{aligned} \tag{17}$$

Returning now to finite α, we normalize V by $2\sigma^2$, conditioning it on the number of surviving samples K_P, and calculate the PDF of the random variable W_k, defined as

$$W_k = \frac{V}{2\sigma^2}, \quad K_P = k. \tag{18}$$

The text in Section 3.1 *of the paper by El Mashade* [3, p. 2273] *reads*:

Operation without excision is obtained from the previous results by letting α tend to infinity which gives

$$n = N, \quad P_{Et} = 1, \quad E\{T_r\} = 2\sigma^2 MT. \tag{28}$$

Returning now to finite α, we normalize Z by $2\sigma^2$, conditioning it on the number of surviving samples n, and calculating the CF of the random variable W_n, defined as

$$W_n = \frac{Z}{2\sigma^2} = \cdots . \tag{29}$$

Instance No. 18

The text in Section 3 *of the paper by Goldman and Bar-David* [2, p. 566] *reads*:

In order to remove the conditioning on K_P, the PDF of W_k is averaged using Eq. (11). The CF of the normalized sample average W is then

$$f_W(w) = \sum_{k=1}^{K} q(k) f_{W_k}(w) = \cdots . \tag{21}$$

The text in Section 3.1 *of the paper by El Mashade* [3, p. 2274] *reads*:

In order to remove the conditioning on n, the CF of W_n is averaged using Eq. (25). The PDF of the normalized sample average W is then

$$C_W(\omega) = \sum_{n=1}^{N} P_n(n) C_{W_n}(\omega). \tag{33}$$

Instance No. 19

The text in Section 4 *of the paper by Goldman and Bar-David* [2, p. 568] *reads*:

The performance of the excision CFAR detector, supplemented by a binary integrator, is now evaluated in terms of the probabilities of false alarm and detection. The numerical example provides some insight into the influence of the various variables on the detector's performance, and therefore assists in the design of proper procedures for the determination of the detector parameters.

The text in Section 3.1 *of the paper by El Mashade* [3, p. 2274] *reads*:

The processor homogeneous performance is evaluated in terms of the false alarm and detection probabilities. The numerical example provides some insight into the influence of the various variables on the detector's performance, and therefore assists in the design of proper procedures for the determination of the detector parameters.

Instance No. 20

The text in Section 4, "*Performance of the excision CFAR detector in the presence of interferers*", *of the paper by Goldman* [1, p. 166] *reads*:

The sample mean computed by the detector is now

$$V = \frac{1}{k+m}\left[\sum_{i=1}^{k} Y_{Ni} + \sum_{i=0}^{m} Y_{Ji}\right],$$
$$0 \leqslant m \leqslant K_J, \quad 1 \leqslant k \leqslant K - K_J. \qquad (19)$$

k is the number of surviving noise samples Y_{Ni} and m is the number of surviving interferers samples Y_{Ji}. We again assume that $k \geqslant 1$, but allow $m = 0$ (i.e. all interferers are excised) with $Y_{J0} = 0$".

The text in Section 3.2, "*Detector performance in nonhomogenous background*", *of the paper by El Mashade* [3, p. 2276] *reads*:

The sample mean computed by the detector is

$$Z = \frac{1}{n+r}\left\{\sum_{i=1}^{n} y_{ti} + \sum_{j=0}^{r} y_{cj}\right\},$$
$$0 \leqslant r \leqslant R, \quad 1 \leqslant n \leqslant N - R. \qquad (35)$$

In the above expression, n and r denote the number of surviving thermal and interferer samples, respectively. We assume that $n \geqslant 1$, but allow $r = 0$ (i.e. all interferer samples are excised) with $y_{c0} = 0$.

Instance No. 21

The text in Section 4, "*Performance of the excision CFAR detector in the presence of interferers*", *of the paper by Goldman* [1, p. 167] *reads*:

Before discussing the performance of the excision CFAR detector as a function of the number of interferers, attention should be drawn to the following phenomenon: when interferers are excised from the sample set, the noise power estimation is based on a smaller number of samples and, if the detection threshold D is set at its value computed for $K_J = 0$, the false alarm probability increases.

The text in Section 3.2, "*Detector performance in nonhomogenous background*", *of the paper by El Mashade* [3, p. 2280] *reads*:

Before discussing the ineffectiveness zone of the excision scheme, attention should be drawn to the following phenomenon: when interferers are excised from the sample set, the noise power estimation is based on a smaller number of samples and, if the detection threshold is set at its value computed for $R = 0$, the false alarm probability increases.

Instance No. 22

The text in Section 4, "*Performance of the excision CFAR detector in the presence of interferers*", *of the paper by Goldman* [1, p. 169] *reads*:

The ineffectiveness zone of the excision CFAR detector is the range below the excision threshold in which interferers are not excised and therefore influence the setting of the detection threshold. The width of the ineffectiveness zone was defined in Ref. [1] as the ratio between the excision threshold B_E and the mean value of the actual noise floor λ_0. This ratio is equal to the excision coefficient α. The phenomenon of the ineffectiveness zone is demonstrated in Figs. 9 and 10 for four interferers and ineffectiveness zones of width 4 and 8, respectively. The graphs of detection probability exhibit a degradation which is maximum at $r_J \sim 6$ dB for $\alpha = 8$

and at $r_J \sim 4$ dB for $\alpha = 4$. The higher the SNR, the smaller is the degradation which almost disappears at high values of SNR.

The text in Section 3.2.2, "*Multiple target situation*", *of the paper by El Mashade* [3, p. 2281] *reads*:

The ineffectiveness zone of the excision CFAR detector is in the range below the excision threshold in which interferers are not excised and therefore influence the setting of the detection threshold. The width of this zone is defined as the ratio between the excision threshold T_E and the mean value of the actual noise power μ_t. This ratio is equal to the excision coefficient α. The phenomenon of the ineffectiveness zone is demonstrated in Figs. 14 and 15 for six interferers and ineffectiveness zones of width 4 and 8, respectively. The graphs of detection probability exhibit a degradation which is maximum at INR $\approx$ 5 dB for $\alpha = 4$ and at INR $\approx$ 6 dB for $\alpha = 8$, in the absence of a noncoherent integration ($M = 1$). The higher the SNR, the smaller is the degradation which almost disappears at high values of SNR.

Instance No. 23

Fig. 10 *in the paper by Goldman* [1, p. 169] *presents*

Effect of ineffectiveness zone on detection probability of the excision detector. $\alpha = 4$; $K = 20$; $K_J = 4$; $P_{FA} = 10^{-4}$.

Fig. 14 *in the paper by El Mashade* [3, p. 2281] *presents*

Effect of ineffectiveness zone on detection probability of the excision CFAR processor with noncoherent integration, in the presence of interfering targets, and $\alpha = 4$.

Instance No. 24

Fig. 9 in the paper by Goldman [1, p. 169] *presents*

Effect of ineffectiveness zone on detection probability of the excision detector. $\alpha = 8$; $K = 20$; $K_J = 4$; $P_{FA} = 10^{-4}$.

Fig. 15 in the paper by El Mashade [3, p. 2281] *presents*

Effect of ineffectiveness zone on detection probability of the excision CFAR processor with noncoherent integration, in the presence of interfering targets, and $\alpha = 8$.

Instance No. 25

The text in Section 4, "*Performance of the excision CFAR detector in the presence of interferers*", *of the paper by Goldman* [1, p. 169] *reads*:

At the extreme situation of a very wide ineffectiveness zone ($\alpha = 8$), four interferers and low SNR, the maximum degradation is only about 1 dB. (The degradation is defined as the increase in SNR required to bring the detection probability in the ineffectiveness zone to its level at INR = 0.) In more benign situations, the degradation is much smaller and it is hardly noticeable for $\alpha \leqslant 3$. As is expected, the P_D curves converge to an asymptote value when INR increases because the actual power of excised interferers is insignificant.

If the interference is intentional, the best strategy of the adversary against an excision CFAR detector ('worst case interference from the point of view of the detector) is adjustment of the interferers' power so that the INR is within the ineffectiveness zone, rather than maximization of the transmitted interference power. The previous results indicate that, even for the 'worst case interference', the deterioration in performance of the excision CFAR detector, operating with a high SNR, is small.

The text in Section 3.2.2, "*Multiple target situation*", *of the paper by El Mashade* [3, p. 2281] *reads*:

At the extreme situation of a very wide ineffectiveness zone ($\alpha = 8$), six interferers and low SNR, the maximum degradation is only about 1 dB (in the single sweep case). The degradation is defined as the increase in SNR required to bring the detection probability in the ineffectiveness zone to its level at INR = 0. In more benign situations, the degradation is much smaller and it is hardly noticeable for low values of α. As is expected, the detection probability curves converge to an asymptotic value when INR increases, because the actual power of the excised interferers is insignificant. If the interference is intentional, the best strategy of the adversary against an excision CFAR detector is the adjustment of the interferers' power so that the INR is within the ineffectiveness zone, rather than maximization of the transmitted interference power. The obtained results indicate that, even for the worst case of interference, the deterioration in performance of the excision CFAR processor, operating with a high SNR, is small.

Instance No. 26

The text in Section 6, "*Summary and discussion*", *of the paper by Goldman and Bar-David* [2, p. 572] *reads*:

This paper has addressed the problem of CFAR detectors designed to operate in an interference saturated environment. In such an environment, the performance of conventional cell-averaging detectors can be drastically degraded, owing to the inevitable influence of the interfering samples on the sample average that is used for the determination of the detection threshold.

The text in Section 4, "*Summary and discussion*", *of the paper by El Mashade* [3, p. 2282] *reads*:

This paper has addressed the problem of CFAR detectors designed to operate in an interference saturated environment. In such an environment, the performance of conventional cell-averaging detectors can be drastically degraded, owing to the inevitable influence of the interfering samples on the sample average that is used for the detection threshold determination.

Instance No. 27

The text in Section 6, "*Summary and discussion*", *of the paper by Goldman and Bar-David* [2, p. 572] *reads*:

The detector combats the effect of variations in the noise level and interferences by adapting the detection threshold to the sample average and by neutralizing the effect of strong interfering signals by excising them prior to the cell averaging operation. Even if not all interferences are excised, the excision of the strongest (and therefore the most damaging to performance) among them is assured.

The text in Section 4, "*Summary and discussion*", *of the paper by El Mashade* [3, p. 2283] *reads*:

This type of adaptive radar detectors combats the effect of variations in the noise level and interferences by adapting the detection threshold to the sample average and by neutralizing the effect of strong interfering signals by excising them prior to the cell averaging operation. Even if not all interferences are excised, the excision of the strongest, and therefore the most damaging to the processor performance, among them is assured.

Instance No. 28

The text in Section 6, "*Summary and discussion*", *of the paper by Goldman and Bar-David* [2, p. 572] *reads*:

The purpose of the integrator is to diminish the effect of strong, random interfering signals, while enhancing the detection probability of a periodic sequence of pulses. The numerical results provide an important insight into the effect of the system's parameters on its performance.

The text in Section 4 "*Summary and discussion*" *of the paper by El Mashade* [3, p. 2282] *reads*:

The purpose of the integrator is to diminish the effect of strong, random interfering signals, while enhancing the detection probability of a periodic sequence of pulses. The numerical results provide an important insight into the effect of the system's parameters on its performance.

Instance No. 29

The text in Section 5 *of the paper by Goldman and Bar-David* [2, p. 572] *reads*:

For the excision CFAR detector to be effective, B_E should be set as low as possible so that any sample that is not a noise sample is excised; but if the input signal is contaminated by a wideband jamming signal, a low B_E can result in excising most of the noise samples, and therefore cause a drastic degradation in the performance. On the other hand, if we set the excision threshold too high, an ineffectiveness zone is created see Fig. 8); samples in this zone which originate from various interfering transmissions are not excised. The width of the ineffectiveness zone is defined as the ratio between the threshold B_E and the mean value of the actual noise floor $2\sigma^2$.

The text in Section 4 *of the paper by El Mashade* [3, p. 2282] *reads*:

For the excision CFAR detector to be effective, the excision threshold should be set as low as possible so that any sample that is not a noise sample is excised; but if the input signal is contaminated by a wide band jamming signal, a low excision threshold can result in excising most of the noise samples and therefore cause a drastic degradation in the performance. On the other hand, if we set the excision threshold too high, an ineffectiveness zone is created. The samples in this zone which originate from various interfering transmissions are not excised. The width of this zone is defined as the ratio between the excision threshold and the mean value of the actual noise level.

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