GPS Solutions (2020) 24:106
https://doi.org/10.1007/s10291-020-01022-w

CORRECTION

Correction to: Effects of a navigation spoofing signal on a receiver loop and a UAV spoofing approach

Chao Ma[1] · Jun Yang[1] · Jianyun Chen[1] · Zhi Qu[1] · Chao Zhou[1]

Published online: 14 August 2020
© Springer-Verlag GmbH Germany, part of Springer Nature 2020

Correction to: GPS Solutions (2020) 24:76
https://doi.org/10.1007/s10291-020-00986-z

In the original article, some typos regarding Eq. (1) and respective sentence are corrected, and corrections are made to a sentence in section "Effect of the frequency difference on the PLL and DLL".

Corrections to Eq. (1):

$$u(t) = \sqrt{2}aC^{auth}(t-\tau_i)D^{auth}(t-\tau_i)\sin(\omega_i(t+\Delta t_i)+\varphi_i) + \sqrt{2}a\alpha_s C^{spoof}(t-\tau_s)D^{spoof}(t-\tau_s)\sin(\omega_s(t+\Delta t_s)+\varphi_s) \quad (1)$$

where the subscript i or superscript *auth* represents the real navigation signal, while the subscript s or superscript *spoof* represents the spoofing signal. a is the signal amplitude. $C(.)$ is the coarse-acquisition (C/A) spread-spectrum code. τ is the initial code phase when the signal reaches the receiving antenna. $D(.)$ is the navigation message, ω is the angular frequency, φ is the initial carrier phase, and Δt is the spatial propagation delay.

Correcting sentences in section "Effect of the frequency difference on the PLL and DLL" as below:

"The previous content analyzes the effects on PLL and DLL when the spoofing signal first intrudes into the receiver. However, we assumed that the spoofing signal has the same carrier frequency as the real signal, which is difficult to achieve in practical application. Assuming that there is a carrier frequency difference between the spoofing signal and real signal, then $f_e^{spoof} \neq 0$. It is seen from (4) and (13) that the existence of a frequency difference has two effects:

1. a phase jump $-\frac{\omega_e^{spoof}\cdot T_{coh}}{2}$ or $\frac{\omega_e^{spoof}\cdot T_{coh}}{2}$ depending on the initial carrier phase difference.
2. attenuation of the amplitude gain of the spoofing signal by a factor of $\mathrm{sinc}(f_e^{spoof}T_{coh})$."

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

The original article can be found online at https://doi.org/10.1007/s10291-020-00986-z.

✉ Jun Yang
mcmtwjyy@gmail.com

[1] College of Intelligence Science and Technology, National University of Defense Technology, No. 109, Deya Road, Changsha 410073, China