Supplementary materials
Article: Four-dimensional reassignment

Karol Abratkiewicz*

May 6, 2025

1 A comparison of different cross-sections of the W2DFT and four-dimensional reassignment

Figure 1 presents different cross-sections of the W2DFT and four-dimensional reassignment for two chirps with the SNR = 10 dB. The results are for three cuts for $t = 20, 50, 80$, $r = 20, 50, 80$, and for the frequency bins of $\omega = 20, 128, 220$ and $\eta = 20, 128, 220$. The distribution had 101 samples in t and r, and 256 points of the Fourier transform in ω and η. The comparison was made such that the displayed results are grouped in sets of four for the same indices of the cross-sections, i.e. the first index for t, the first index for r, the first index for ω, and the first index for η, for example, $t = 20$, $r = 20$, $\omega = 20$, and $\eta = 20$. Subsequent comparisons follow for the second index, i.e. $t = 50$, $r = 50$, $\omega = 128$, and $\eta = 128$, and for the third index, $t = 80$, $r = 80$, $\omega = 220$, and $\eta = 220$. The outcomes clearly show that the four-dimensional reassignment is not a super-resolution method, but efficiently concentrates the energy on local maxima.

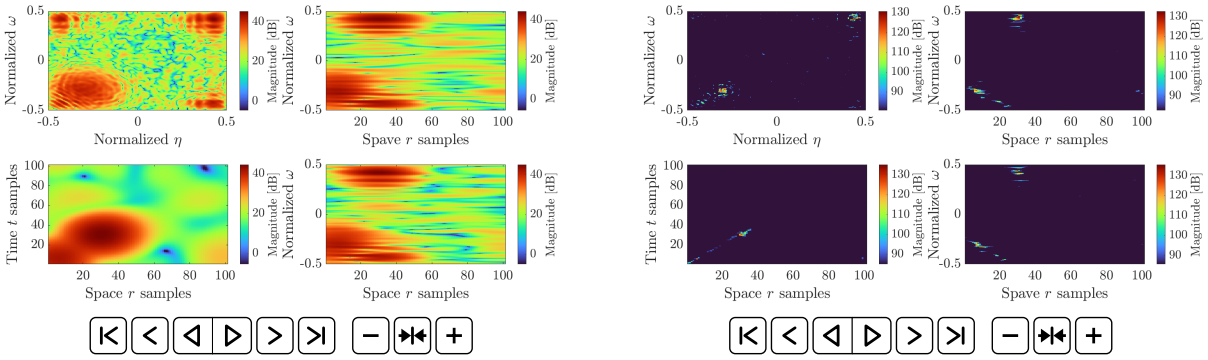

Figure 1: A comparison of various selected cross-sections through the W2DFT (left-hand side animation) and its concentrated version (the right-hand side animation). The animation can be run using Adobe Reader. If the animation does not work, it can be downloaded from `https://github.com/kabratkiewicz/W2D-FT/blob/main/documents/supplementary_materials.pdf`.

2 Full radar range-Doppler map

Figure 2 presents the full range-Doppler map of the radar signal analyzed in Section III B in the main article. Due to the limited scope of the work, this result was not presented.

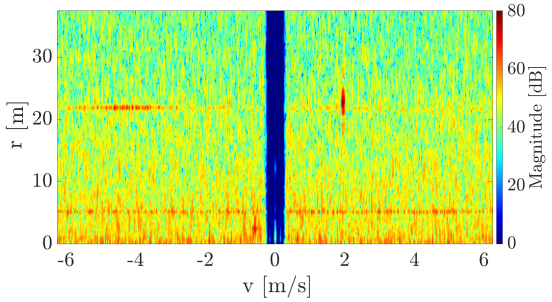

Figure 2: Full range-Doppler map of the signal analyzed in the article.

*Institute of Electronic Systems, Warsaw University of Technology, 00-665 Warsaw, Poland, karol.abratkiewicz@pw.edu.pl.