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1003-65-485 **Guoping Zhang** and **Fengshan Liu*** (fliu@desu.edu), Department of Mathematics, Delaware State University, 1200 N Dupont Hwy, Dover, DE 19901, and **Yi Ling** and **Xiquan Shi**.
Interpolation with back projection algorithm for UWB SAR imaging with noise.

ARL (Army Research Laboratory) uses the BoomSAR system (a kind of ground penetrating radar) to collect the raw data (scattering data) and employs the back-projection (delay-and-sum beam former) technique to form UWB (ultra-wide band) SAR images. The back-projection algorithm is expected to produce higher quality images, provided the original radar motion is available. In the case when the radar aperture is moving on a straight line, the sampling summation over the noise is zero. Therefore the noise is cancelled over the back projection. However, the small vibration, particularly the vibration on the down-range direction, of the boom and basket (that holds the antennas and radar system) during motion produces noise to the radar signal. With the current back projection method, the noise can not be removed effectively. Our work is to design a new algorithm (high accuracy interpolation with back-projection algorithm) to reduce the noise appearing in UWB SAR images of ARL. (Received September 16, 2004)