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**George K. Yang\*** (georgiyang@gmail.com), 515 Nichol Rd, Nashville, TN 37209. *On Random Fields and Their Wavelet Transforms.*

We first introduce the theory of wavelet transforms of functions in  $L^2(R)$  and in the space  $S(R)$  of Schwartz functions, and extend the concept of wavelet transforms to tempered distributions. Then we treat the stochastic processes and random fields as tempered distributions in  $S'(R)$ , the dual space of the space  $S(R)$ . Using the above theory to stochastic processes and random fields, we find that the expected value of the wavelet transform of the difference of an observed signal process minus the true signal is equal to the wavelet transform of the mean function of the random noise process. Also, we show that the  $L^2(\Omega \times R^2)$ -norm of the wavelet transform of the difference of the same observed signal process minus the true signal is equal to the  $L^2(\Omega \times R)$ -norm of the random noise process. (Received September 21, 2011)