List of Notations

Objects

$I$ Original image / object for watermarking
$s$ The mark to be introduced on the original image / object
$\tilde{I}$ Marked image / object
$\tilde{I}'$ Potentially (suspected to be) marked image / object
$I^s$ Low quality image / object
$s^{(i)}$ User-specific mark to be introduced on the original image / object for the $i^{th}$ user
$\tilde{I}^{(i)}$ Marked image / object for the $i^{th}$ user
$\tilde{I}^{(i,\#)}$ Forged marked image / object for the $i^{th}$ user
$I_d$ DCT transformed image for original image $I$
$\tilde{I}_d^{(i)}$ Modified DCT transformed image after marking for $i^{th}$ user
$V$ Original video object
$V'$ Encoded video object
$Z_{10^{16}}$ Ring of integers modulo $10^{16}$
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Functions

\( E_A \) \hspace{1cm} \text{Energy for lc-subregion } A

\( X_A \) \hspace{1cm} \text{Energy for a } 8 \times 8 \text{ DCT block } A

\( E(X) \) \hspace{1cm} \text{Expectation of a random variable } X

\( V(X) \) \hspace{1cm} \text{Variance of a random variable } X

\( X^C \) \hspace{1cm} \text{Estimate for the random variable } X

\( CORR(X, Y) \) \hspace{1cm} \text{Correlation between random variables } X \text{ and } Y

\( H(X) \) \hspace{1cm} \text{Entropy of the distribution of random variable } X

\( Q(I, J) \) \hspace{1cm} \text{PSNR of image } I \text{ with respect to image } J

\( \phi(I, J) \) \hspace{1cm} \text{MSE between two images } I \text{ and } J

\( X \oplus Y \) \hspace{1cm} \text{Bitwise XOR between variables } X \text{ and } Y