

## LIST OF SYMBOLS

$a$	: An action
$b$	: Bit information
$e$	: Errors
$h$	: Hidden layer
$y$	: Output of neural network
$C$	: Channel capacity
$A(t)$	: Action at time step $t$
$e_j^{(h)}$	: The error of the $j$ -th neuron of the $h$ -th layer
$J_t$	: Return following time $t$
$L_v$	: The LLR values in VND
$P(X)$	: Marginal probability of $X$
$R_a$	: The reward obtained by the agent choosing an action $a$
$s, s'$	: States
$S(t)$	: State at time step $t$
$Z$	: Positive integer
$\mathcal{A}$	: Set of all actions space
$\mathcal{D}_S$	: Domain source
$\mathcal{D}_T$	: Domain target
$\mathcal{E}$	: Complexity in CND
$\mathcal{F}$	: Complexity in VND
$\mathcal{M}$	: Modulation
$\mathcal{N}$	: Normal distribution
$O$	: Complexity
$\mathcal{W}$	: Weight of neural network
$\mathcal{W}_{\mathcal{D}_S}$	: Weight in domain source
$\mathcal{W}_{\mathcal{D}_T}$	: Weight in domain target
$\mathcal{R}$	: Coding rate
$\mathbb{A}$	: Random number with normal distribution

$\mathbb{B}$	: Random number with normal distribution
$\mathbb{I}(\cdot)$	: The indicator function
$\mathbb{E}[X]$	: Expectation of a random variable $X$
$\mathbb{N}[k]_{m-n}$	: Neural network structure with the total number of neurons $\mathbb{N}[k]$ in the hidden layer
$\mathbb{J}$	: Complexity of transfer learning
$\mathbb{K}$	: Complexity of reinforcement learning
$\mathbb{L}$	: Complexity of traditional rateless coding
$\mathbb{R}$	: Real values
$\mathbf{B}$	: Base matrix
$\mathbf{G}$	: Generator matrix
$\mathbf{H}$	: Parity check matrix
$\mathbf{W}$	: Weight matrix
$\mathfrak{h}$	: Channels
$\mathfrak{x}$	: MC iteration in traditional rateless coding
$\mathfrak{z}$	: EP iteration in traditional rateless coding
$\mathcal{M}$	: Number neuron in the layer
$\mathcal{N}$	: Number of edges connected to each neuron
$\mathcal{P}$	: Number of edges connected in CND
$\mathcal{Q}$	: Number of edges connected in VND
$\mathcal{S}$	: Global iteration of traditional rateless coding
$u \rightarrow v$	: CND to VND
$v \rightarrow u$	: VND to CND
$\alpha$	: Learning rate parameter
$\varepsilon$	: Probability of taking a random action in an $\varepsilon$ -greedy policy
$\mathcal{E}$	: A set of episodes
$\pi$	: Policy (decision-making rule)
$\pi_a(s)$	: Action taken in state $s$ under deterministic policy $\pi$
$\pi^*$	: Optimal policy
$\delta_{\text{MSE}}$	: Mean square error
$\xi$	: Sign error rate
$\gamma$	: Discount factor parameter
$\arg \max_a Q(s, a)$	: A value of $a$ at which $Q(s, a)$ takes its maximal value
$\max$	: Maximum

$\nabla \mathcal{L}(\mathcal{W})$  : Partial derivatives of  $\mathcal{L}(\mathcal{W})$  with respect to  $\mathcal{W}$   
 $\in$  : An element of; e.g.,  $a \in \mathcal{A}$ ,  $r \in R$   
 $\boxplus$  : The box-plus operation  
 $\leftarrow$  : Assignment