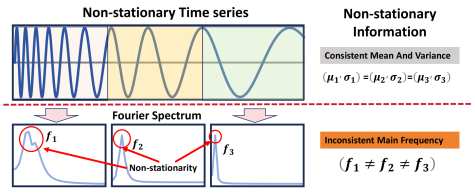
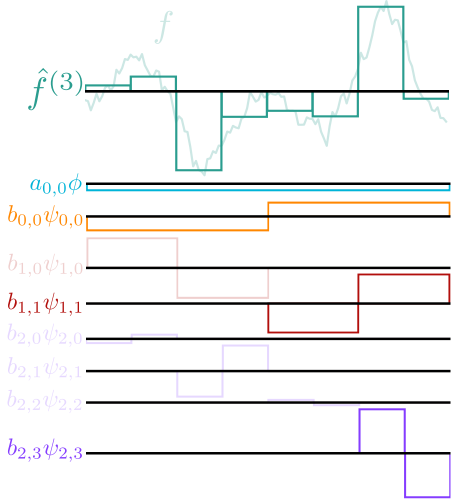
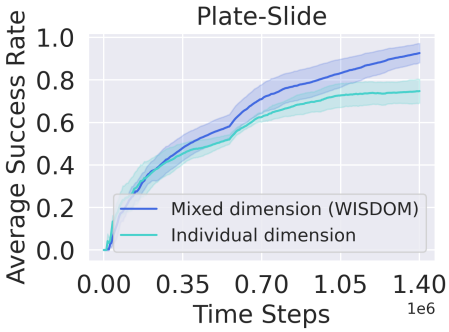


(a) This non-stationary time series (NSTS) has three segments (pink–yellow–green) that share similar time-domain statistics. However, their Fourier spectrum are completely distinct. This highlights that indistinguishable signals in the time-domain can be easily identified in the frequency domain. However, the Fourier Transform does not reveal when each frequency component appears. E.g., reversing the sequence (green-yellow-pink) alters the pattern from fast-to-slow into slow-to-fast, yet the Fourier spectra remain identical. (FAN, NeurIPS'24)



(b) WT can effectively handle NSTS due to its time-frequency localization and multi-resolution analysis properties. Each decomposition step halves the time window for low-frequency components, allowing finer focus on localized high-frequency details. Through iterative convolution, WT progressively separates high- from low-frequency components, enabling accurate signal reconstruction using features across multiple scales. Note that components belonging to the same resolution have the same color. (MultiResLayer, ICML'23)

Figure 14: An example to illustrate our motivation for employing Wavelet Transform (WT).



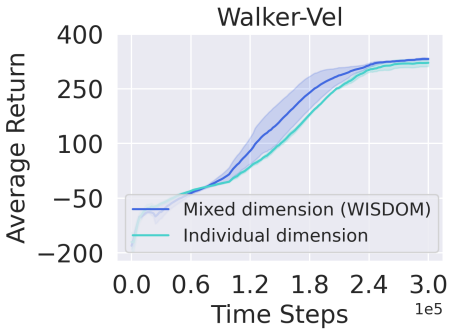


Figure 15: Comparison of individual transform on each dimension and transform on integral dimension of task representations.

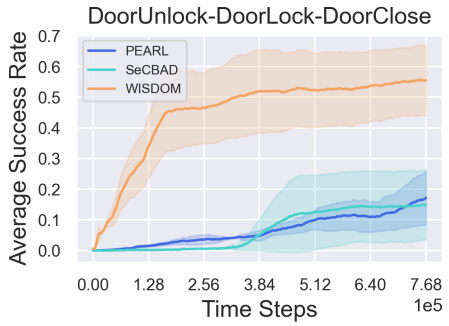


Figure 16: Evaluation on simultaneously adapting to multiple non-stationary environments.

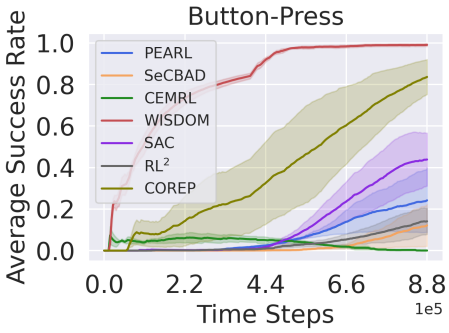


Figure 17: Evaluation on noisy environments.