

Methods	Hyperparameter space
GRU4Rec	layer_num $\sim \{1, 2, 3\}$, lr $\sim \{1e-2, 1e-3, 1e-4\}$, l2 $\sim \{1e-3, 1e-4, 1e-5, 1e-6, 1e-7\}$, embed_size $\sim \{32, 64, 128\}$
Caser	layer_num $\sim \{1, 2, 3\}$, lr $\sim \{1e-2, 1e-3, 1e-4\}$, l2 $\sim \{1e-3, 1e-4, 1e-5, 1e-6, 1e-7\}$, embed_size $\sim \{32, 64, 128\}$
SASRec	layer_num $\sim \{1, 2, 3\}$, lr $\sim \{1e-2, 1e-3, 1e-4\}$, l2 $\sim \{1e-3, 1e-4, 1e-5, 1e-6, 1e-7\}$, embed_size $\sim \{32, 64, 128\}$
TALLRec	lr $\sim \{1e-3, 1e-4, 1e-5\}$, warm_up_ratio $\sim \{0.03, 0.05\}$, gradient_norm $\sim \{0.1, 0.2, 0.3\}$
LLaRA	lr $\sim \{1e-3, 1e-4, 1e-5\}$, warm_up_ratio $\sim \{0.03, 0.05\}$, gradient_norm $\sim \{0.1, 0.2, 0.3\}$
S-DPO	$\beta \sim \{0.1, 1, 5\}$

Table 1: Hyperparameter search space for baselines.

	LastFM			MovieLens				
	HitRatio@3	HitRatio@5	NDCG@3	NDCG@5	HitRatio@3	HitRatio@5	NDCG@3	NDCG@5
GRU4Rec	0.4370	0.4964	0.3544	0.4110	0.4831	0.5584	0.4075	0.4702
Caser	0.4445	0.4918	0.3564	0.4232	0.4892	0.5603	0.4134	0.4724
SASRec	0.4253	0.4792	0.3382	0.4073	0.4256	0.5132	0.3881	0.4239
TALLRec	0.6814	0.7473	0.3900	0.4650	0.4874	0.5408	0.4290	0.4601
LLaRA	0.7223	0.7862	0.6016	0.6972	0.5505	0.6189	0.4752	0.5067
S-DPO	0.8313	0.8858	0.7545	0.7751	0.6842	0.7684	0.5603	0.5905

Table 2: Performance comparison of different models on LastFM and MovieLens datasets with more evaluation metrics.

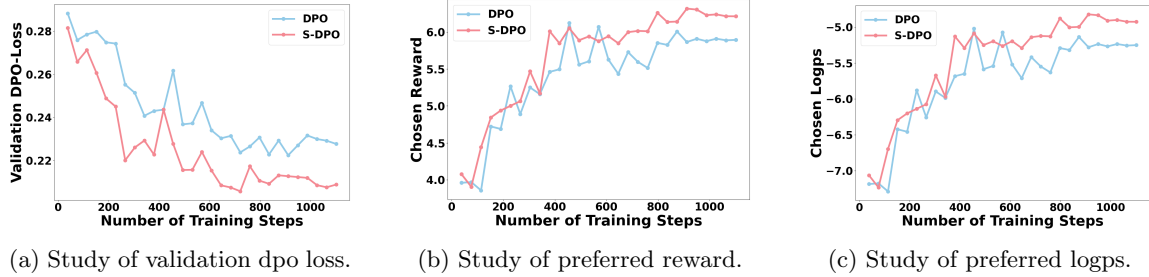


Figure 1: Comparison between DPO and S-DPO (3 negatives) on LastFM.