Supplementary Material for "Diffusion Model Based Posterior Sampling for Noisy Linear Inverse Problems"

In this supplementary material, we provide results on the effect of scaling parameter λ, as well as results on more datasets.

Effect of Scaling Parameter λ

As shown in both Algorithm 1 and Algorithm 2, a hyper-parameter λ is introduced as a scaling value for the likelihood score. Empirically it is found that DMPS is robust to different choices of λ around 1 though most of the time $\lambda > 1$ yields slightly better results. As one specific example, we show the results of DMPS for super-resolution for different values of λ, as shown in Figure 5 (DDPM version) and Figure 6 (flow-based version). It can be seen that DMPS is robust to different choices of λ, i.e., it works well in a wide range of values.

Figure 5: Results of DMPS (DDPM version) with different λ for the task of noisy super-resolution ($\times 4$) with $\sigma = 0.05$.

Results on More Datasets

We provide more experimental results on AFHQ-cat and LSUN-bedroom for flow-based models are shown as follows:

	super-resolution			deblur			colorization			denoising		
Method	PSNR ↑	SSIM ↑	LPIPS ↓	PSNR ↑	SSIM ↑	LPIPS ↓	PSNR ↑	SSIM ↑	LPIPS ↓	PSNR ↑	SSIM ↑	LPIPS ↓
DMPS (DDPM, ours)	**26.79**	**0.7653**	**0.2632**	**27.22**	**0.7571**	**0.2909**	**25.07**	**0.9190**	**0.3124**	28.59	**0.7994**	**0.2882**
DPS (DDPM)	23.08	0.6127	0.3860	24.64	0.6625	0.3033	15.92	0.5976	0.6381	**28.86**	0.7828	0.2941
PGDM	25.44	0.7185	0.2837	26.69	0.7316	0.2896	16.74	0.6348	0.5335	27.06	0.7453	0.3236

Table 3: Results on FFHQ-Cat validation dataset using the same pre-trained DDPM model.

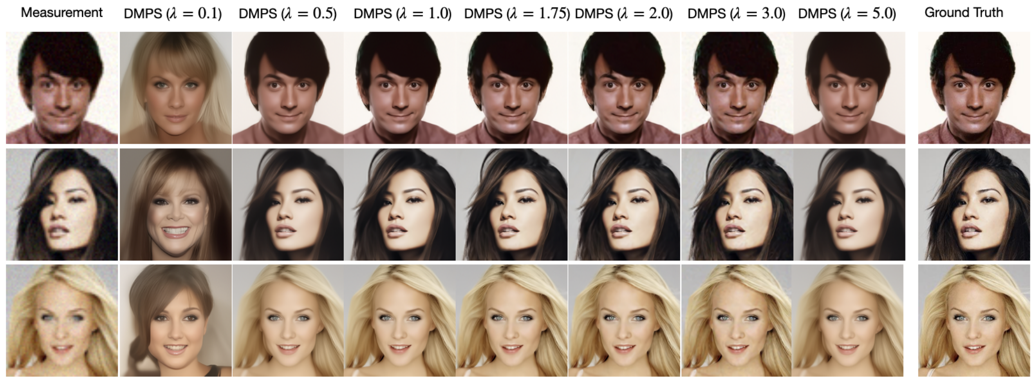

Figure 6: Results of DMPS (flow-based version) with different λ for the task of noisy super-resolution ($\times 4$) with $\sigma = 0.05$.

	super-resolution			**deblur**			**colorization**			**denoising**		
Method	PSNR ↑	SSIM ↑	LPIPS ↓	PSNR ↑	SSIM ↑	LPIPS ↓	PSNR ↑	SSIM ↑	LPIPS ↓	PSNR ↑	SSIM ↑	LPIPS ↓
DMPS (DDPM, ours)	**25.63**	**0.7362**	**0.2281**	**28.21**	**0.8162**	**0.2113**	**23.19**	**0.9344**	**0.2117**	29.81	0.8599	0.1884
DPS (DDPM)	22.83	0.6190	0.3275	24.97	0.6988	0.2593	11.38	0.5375	0.6606	**30.75**	**0.8674**	**0.1841**
PGDM	24.60	0.6854	0.2590	26.90	0.7721	0.2482	17.69	0.7335	0.3350	27.90	0.8153	0.2304

Table 4: Results on LSUN-Bedroom validation dataset using the same pre-trained DDPM model.

	super-resolution			**deblur**			**colorization**			**denoising**		
Method	PSNR ↑	SSIM ↑	LPIPS ↓	PSNR ↑	SSIM ↑	LPIPS ↓	PSNR ↑	SSIM ↑	LPIPS ↓	PSNR ↑	SSIM ↑	LPIPS ↓
DMPS (Flow-based, ours)	**29.06**	**0.7905**	**0.2627**	**26.74**	**0.6942**	**0.3192**	24.65	**0.9140**	**0.2531**	**26.53**	**0.7870**	**0.3353**
DPS (Flow-based)	27.61	0.7089	0.3190	23.26	0.5534	0.4122	21.64	0.8259	0.3833	26.10	0.6418	0.4049
OT-ODE	27.61	0.7081	0.3205	26.32	0.6592	0.3333	**25.21**	0.8692	0.3180	23.12	0.3647	0.5289

Table 5: Results on AFHQ-Cat validation dataset using the same pre-trained flow-based model.

	super-resolution			**deblur**			**colorization**			**denoising**		
Method	PSNR ↑	SSIM ↑	LPIPS ↓	PSNR ↑	SSIM ↑	LPIPS ↓	PSNR ↑	SSIM ↑	LPIPS ↓	PSNR ↑	SSIM ↑	LPIPS ↓
DMPS (Flow-based, ours)	**24.36**	**0.6795**	0.3837	**23.19**	**0.5869**	**0.4384**	**23.37**	**0.8756**	**0.2838**	22.68	**0.6477**	**0.4458**
DPS (Flow-based)	24.39	0.6430	**0.3781**	20.13	0.4318	0.4931	11.03	0.5283	0.7843	23.18	0.5457	0.4598
OT-ODE	23.88	0.6193	0.4001	22.69	0.5590	0.4264	**23.62**	0.7592	0.3923	18.17	0.2039	0.6405

Table 6: Results on LSUN-Bedroom validation dataset using the same pre-trained flow-based model.