Notes on Flow Matching and Diffusion Models

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We will be discussing two widely used generative AI algorithms: denoising diffusion models, and flow matching.

These generative models generate objects by iteratively converting noise into data with the help of ordinary or stochastic differential equation (ODEs/SDEs) models.

# References

[1] [An Introduction to Flow Matching and Diffusion Models, Peter Holderrieth and Ezra Erives, Notes from MIT Class 6.S184, 2025](https://github.com/dimitarpg13/information_theory_and_statistical_mechanics/blob/main/literature/articles/generative_models/An_Introduction_to_Flow_Matching_and_Diffusion_Models_Holderrieth_MIT_2025.pdf)

[2] MIT Class 6.S184 website: <https://diffusion.csail.mit.edu/>

[3] [Score-Based Generative Modeling through Stochastic Differential Equations, Yang Song et al, Stanford U., 2021](https://github.com/dimitarpg13/information_theory_and_statistical_mechanics/blob/main/literature/articles/generative_models/Score-Based_Generative_Modeling_through_Stochastic_Differential_Equations_Song_2021.pdf)

[4] [Flow Matching for Generative Modeling, Yaron Lipman et al, Meta FAIR, 2023](https://github.com/dimitarpg13/information_theory_and_statistical_mechanics/blob/main/literature/articles/generative_models/Flow_Matching_for_Generative_Modeling_Lipman_Meta_2023.pdf)

[5] [Flow Straight and Fast: Learning to Generate and Transfer Data with Rectified Flow, X. Liu et al, 2022](https://github.com/dimitarpg13/information_theory_and_statistical_mechanics/blob/main/literature/articles/generative_models/Flow_Straight_and_Fast-Learning_to_Generate_and_Transfer_Data_with_Rectified_Flow_Liu_2022.pdf)

[6] [Stochastic Interpolants: A Unifying Framework for Flows and Diffusions, Michael S. Albergo et al, 2023](https://github.com/dimitarpg13/information_theory_and_statistical_mechanics/blob/main/literature/articles/generative_models/Stochastic_Interpolants-A_Unifying_Framework_for_Flows_and_Diffusions_Albergo_NYU_2023.pdf)

[7] [Flow Matching Guide and Code, Yaron Lipman et al, 2024](https://github.com/dimitarpg13/information_theory_and_statistical_mechanics/blob/main/literature/articles/generative_models/Flow_Matching_Guide_and_Code_Lipman_2024.pdf)

[8] flow\_matching library at <https://github.com/facebookresearch/flow_matching>