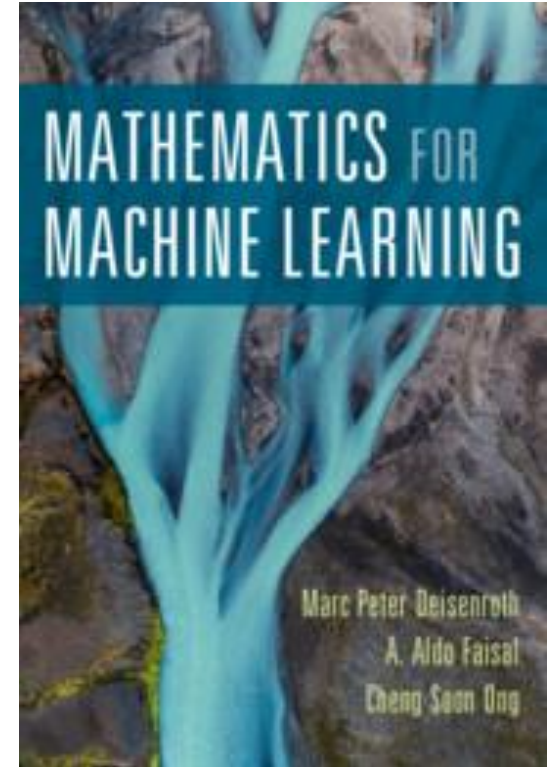


# Reading list: books, tutorials & reviews

(If you need to refresh your math skills)

Deisenroth, Faisal, Ong  
“Mathematics for Machine Learning”

<https://mml-book.github.io/>

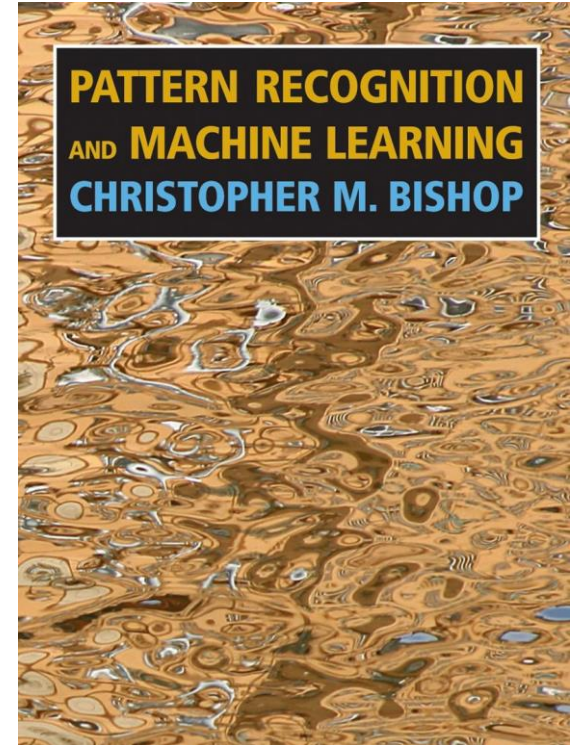


# Reading list: books, tutorials & reviews

Chris Bishop's PRML book

<https://www.microsoft.com/en-us/research/people/cmbishop/prml-book/>

- Chapters 2, 4 (basics in probabilistic models)
- Chapters 8-11 (graphical models, approximate inference, sampling methods)



# Reading list: books, tutorials & reviews

Wainwright and Jordan (2008)

“Graphical Models, Exponential Families, and Variational Inference”

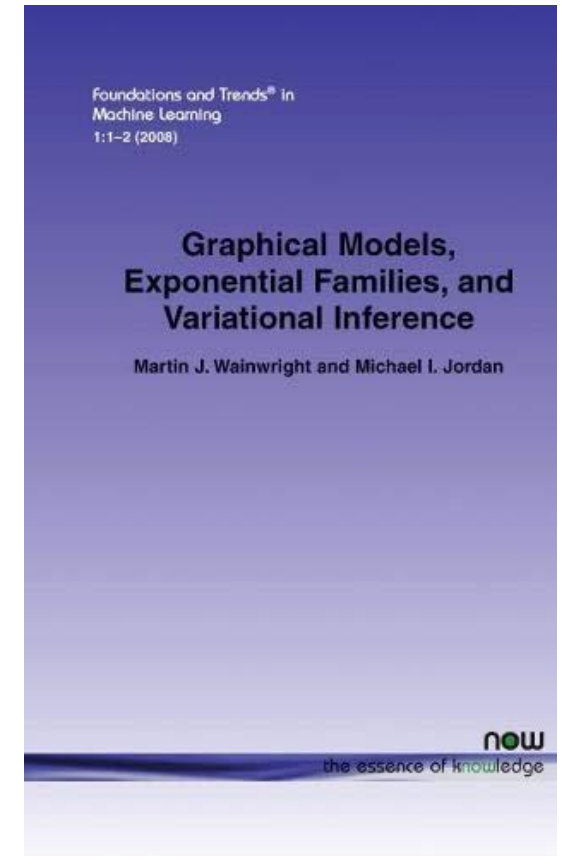
Foundations and Trends in Machine Learning

[https://people.eecs.berkeley.edu/~wainwrig/Papers/WaiJor08\\_FTML.pdf](https://people.eecs.berkeley.edu/~wainwrig/Papers/WaiJor08_FTML.pdf)

An excellent tutorial on graphical model inference

(many topics introduced from convex optimisation point of view)

- Chapters 2-3 (basics in graphical models and exponential families)
- Chapters 4-5 (VI and message passing on graphs)
- Chapter 6 (variational methods for parameter estimations)



# Reading list: books, tutorials & reviews

- Approximate inference methods:
  - Gradient estimation:
    - Mohamed et al. (2019) “Monte Carlo Gradient Estimation in Machine Learning”
    - <https://arxiv.org/abs/1906.10652>
  - Normalising flow:
    - Papamakarios et al. (2019) “Normalizing Flows for Probabilistic Modeling and Inference”
    - <https://arxiv.org/abs/1912.02762>
  - Variational auto-encoders:
    - Kingma & Welling (2019) “An Introduction to Variational Autoencoders”
    - <https://arxiv.org/abs/1906.02691>
  - EP roadmap (Tom Minka)
    - <https://tminka.github.io/papers/ep/roadmap.html>

# Reading list: books, tutorials & reviews

- Sampling methods:
  - Importance sampling:
    - Art Owen's Monte Carlo book, Chapter 9 "Importance sampling"
    - <https://statweb.stanford.edu/~owen/mc/Ch-var-is.pdf>
  - Sequential Monte Carlo:
    - Doucet & Johansen (2008) "A Tutorial on Particle Filtering and Smoothing: Fifteen years later"
    - [https://www.stats.ox.ac.uk/~doucet/doucet\\_johansen\\_tutorialPF2011.pdf](https://www.stats.ox.ac.uk/~doucet/doucet_johansen_tutorialPF2011.pdf)
    - Naesseth et al. (2019) "Elements of Sequential Monte Carlo"
    - <https://www.nowpublishers.com/article/Details/MAL-074>
  - MCMC:
    - Andrieu et al. (2003) "An Introduction to MCMC for Machine Learning"
    - [https://www.cs.ubc.ca/~arnaud/andrieu\\_defreitas\\_doucet\\_jordan\\_intromontecarlomachinelearning.pdf](https://www.cs.ubc.ca/~arnaud/andrieu_defreitas_doucet_jordan_intromontecarlomachinelearning.pdf)

# Other tutorials to watch online

- Approximate Inference tutorial by Tom Minka (MLSS 2009, mainly message passing)
  - [http://videolectures.net/mlss09uk\\_minka\\_ai/](http://videolectures.net/mlss09uk_minka_ai/)
- MCMC tutorial by Iain Murray (MLSS 2019)
  - <https://www.youtube.com/watch?v=v4Eb09qp7Q>
- Variational Inference by Blei, Ranganath, Mohamed (NeurIPS 2016)
  - [https://www.youtube.com/watch?v=ogdv\\_6dbvVQ](https://www.youtube.com/watch?v=ogdv_6dbvVQ)
- Scalable MCMC by David Dunson (NeurIPS 2018)
  - <https://www.youtube.com/watch?v=6zOTL5S9H-Y>

# Other tutorials to watch online

- Variational Inference tutorial by Tamara Broderick (ICML 2018)
  - <https://www.youtube.com/watch?v=Moo4-KR5qNg>
- Bayesian deep learning tutorial by Emti Khan (NeurIPS 2019)
  - <https://slideslive.com/38923183/deep-learning-with-bayesian-principles>
- Divergences and IPMs by Gretton, Sutherland, Jitkrittum (NeurIPS 2019)
  - <https://slideslive.com/38923184/interpretable-comparison-of-distributions-and-models>
- Uncertainty estimation by Tran, Snoek, Lakshminarayanan (NeurIPS 2020)
  - Including non-Bayesian methods

# Shameless Plug

- Yingzhen Li's PhD Thesis
  - “Approximate Inference: New Visions” (PhD Thesis, 2018)
  - [http://yingzhenli.net/home/pdf/phd\\_thesis.pdf](http://yingzhenli.net/home/pdf/phd_thesis.pdf)
- Cheng Zhang's review paper on variational inference
  - Zhang et al. (2019) “Advances in Variational Inference”
  - <https://ieeexplore.ieee.org/abstract/document/8588399>