

## **Background References:**

- Z. Kolter. Linear Algebra Review and Reference, 2015. <http://cs229.stanford.edu/section/cs229-linalg.pdf>
- Gilbert Strang. Introduction to Linear Algebra, 5th edition, 2016. <https://math.mit.edu/~gs/linearalgebra/ila5/indexila5.html>
- A.-L. Barabási. Network Science, 2012. <http://networksciencebook.com/>
- M. E. J. Newman. The Structure and Function of Complex Networks. SIAM Review, 45(2), 167-256, 2003. <https://arxiv.org/pdf/cond-mat/0303516.pdf>

## **Readings for the Lectures:**

- L. Torres, A. Sizemore Blevins, D.S. Bassett, T. Eliassi-Rad. The Why, How, and When of Representations for Complex Systems. SIAM Review (SIREV), 63(3): 435-485, 2021. <https://epubs.siam.org/doi/pdf/10.1137/20M1355896>
- L. Torres, P. Suárez-Serrato, T. Eliassi-Rad. Non-backtracking Cycles: Length Spectrum Theory and Graph Mining Applications. Applied Network Science, Volume 4, Article 41, 2019. [http://eliassi.org/papers/appliednetsci19\\_nbd.pdf](http://eliassi.org/papers/appliednetsci19_nbd.pdf)
- I. Chami, S. Abu-El-Haija, B. Perozzi, C. Ré, K. Murphy. [Machine Learning on Graphs: A Model and Comprehensive Taxonomy](#). arXiv:2005.03675, v3. 2022.
- D. Liu, T. Eliassi-Rad. STABLE: Identifying and Mitigating Instability in Embeddings of the Degenerate Core. In Proceedings of the 2023 SIAM International Conference on Data Mining (SDM), 2023. <https://dliu18.github.io/publication/stable>
- L. Torres, K.S. Chan, T. Eliassi-Rad. GLEE: Geometric Laplacian Eigenmap Embedding. Journal of Complex Networks, 8(2), cnaa007, 2020. [http://eliassi.org/papers/torres\\_jcn2020.pdf](http://eliassi.org/papers/torres_jcn2020.pdf)
- C. Seshadhri, A. Sharma, A. Stolman, A. Goel. The Impossibility of Low-rank Representations for Triangle-rich Complex Networks, Proceedings of the National Academy of Sciences, 117(11), 5631-5637, 2020. <https://www.pnas.org/doi/abs/10.1073/pnas.1911030117>
- A. Stolman, C. Levy, C. Seshadhri, A. Sharma. Classic Graph Structural Features Outperform Factorization-Based Graph Embedding Methods on Community Labeling, In Proceedings of the 2022 SIAM International Conference on Data Mining (SDM), 2022. <https://epubs.siam.org/doi/abs/10.1137/1.9781611977172.44>

## **Programming Exercises for the Lectures:**

Reproduce the results in

D. Liu, T. Eliassi-Rad. STABLE: Identifying and Mitigating Instability in Embeddings of the Degenerate Core. In Proceedings of the 2023 SIAM International Conference on Data Mining (SDM), 2023. <https://dliu18.github.io/publication/stable>

The code for the paper is at <https://github.com/dliu18/stable>. You can find graph data at these repositories:

- <http://snap.stanford.edu/data/>
- <https://icon.colorado.edu>
- <https://networkrepository.com>
- <https://networks.skewed.de>
- [https://ogb.stanford.edu/docs/dataset\\_overview/](https://ogb.stanford.edu/docs/dataset_overview/)
- <http://www.cs.cmu.edu/~kijungs/codes/kcore/>