MA477: Data Science

Lesson 28-29 Board Sheet — 26 March 2026

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1 RNN Lesson Objectives

- Be able to explain the structure of recurrent neural networks, including how they process sequential data and the role of hidden states.
- Be able to build and train RNN models using Python and deep learning frameworks
- Be able to evaluate RNN performance using appropriate metrics, compare RNNs with alternative models

Discussion Questions

1. **What does using / passing the hidden state $\mathbf{h}^{(t)}$ instead of processing each $\mathbf{x}^{(t)}$ independently do?**
2. **What is the difference between $\mathbf{y}^{(t)}$ and $\mathbf{h}^{(t)}$?**
3. **What are some hyperparameter choices that must be made with RNNs?**
4. **What are some problems with RNNs (hint: gradients)?**