

# Machine Learning 2 — Homework 4

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September 25, 2019

## Problem 1.

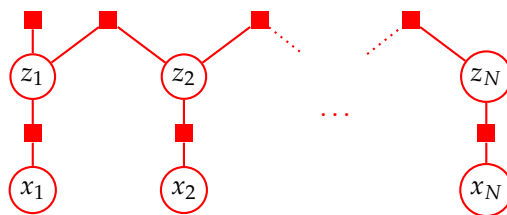
We have  $\mathbf{X} = \{x_1, \dots, x_N\}$  and  $\mathbf{Z} = \{z_1, \dots, z_N\}$ .

1.

$$p(\mathbf{Z}, \mathbf{X}) = p(z_1) \cdot \left( \prod_{i=2}^N p(z_i | z_{i-1}) \right) \cdot \left( \prod_{i=1}^N p(x_i | z_i) \right)$$

2.

We present the factor graph for the Markov chain:



3.

4.

**Problem 2.**

1.

2.

**Problem 3.**

**Problem 4.**