



Bookmarks

- ▶ Introduction
- ▶ Part 1: Probability and Inference
- ▼ **Part 2: Inference in Graphical Models**

**Week 5: Introduction to Part 2 on Inference in Graphical Models**

**Week 5: Efficiency in Computer Programs**

Exercises due Oct 20, 2016 at 02:30 IST



**Week 5: Graphical Models**

Exercises due Oct 20, 2016 at 02:30 IST



**Week 5: Homework 4**

Homework due Oct 20, 2016 at 02:30 IST



**Week 6: Inference in Graphical Models - Marginalization**

Part 2: Inference in Graphical Models > Week 5: Graphical Models > Practice Problem: Computing the Normalization Constant

## Practice Problem: Computing the Normalization Constant

🔖 Bookmark this page

### PRACTICE PROBLEM: COMPUTING THE NORMALIZATION CONSTANT


It turns out that once we know the potential functions, the normalization constant  $Z$  becomes fixed since the distribution needs to sum to 1. Let's show this for a simple case. Consider a two node graphical model with an edge between the two nodes corresponding to

$$p_{X_1, X_2}(x_1, x_2) = \frac{1}{Z} \phi_1(x_1) \phi_2(x_2) \psi_{12}(x_1, x_2).$$


Suppose that we are given what the potential functions are. Show what  $Z$  is equal to as a function of  $\phi_1$ ,  $\phi_2$ , and  $\psi_{12}$ .

*Hint:* Sum both sides over all values of  $x_1$  and all values of  $x_2$ . What is  $\sum_{x_1} \sum_{x_2} p_{X_1, X_2}(x_1, x_2)$  equal to?


Because knowing the potentials fixes what the value of  $Z$  is, often times we'll omit writing  $Z$  and instead write

Exercises due Oct 27, 2016 at 02:30 IST 

**Week 6: Special Case: Marginalization in Hidden Markov Models**

Exercises due Oct 27, 2016 at 02:30 IST 

**Week 6: Homework 5**

Homework due Oct 27, 2016 at 02:30 IST 

**Weeks 6 and 7: Mini-project on Robot Localization (to be posted)**

$$p_{\underline{X}}(\underline{x}) \propto \prod_{i \in V} \phi_i(x_i) \prod_{(i,j) \in E} \psi_{ij}(x_i, x_j),$$

where "α" means "proportional to".

© All Rights Reserved



© 2016 edX Inc. All rights reserved except where noted. EdX, Open edX and the edX and Open EdX logos are registered trademarks or trademarks of edX Inc.

POWERED BY  
OPENedX®

