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## Problem 5: Hypothesis test between two normals

(4/4 points)

Conditioned on the result of an unbiased coin flip, the random variables  $T_1, T_2, \dots, T_n$  are independent and identically distributed, each drawn from a common normal distribution with mean zero. If the result of the coin flip is Heads this normal distribution has variance **1**, otherwise it has variance **4**. Based on the observed values  $t_1, t_2, \dots, t_n$ , we use the MAP rule to decide whether the normal distribution from which they were drawn has variance **1** or variance **4**. The MAP rule decides that the underlying normal distribution has variance **1** if and only if

$$\left| c_1 \sum_{i=1}^n t_i^2 + c_2 \sum_{i=1}^n t_i \right| < 1.$$

Find the values of  $c_1 \geq 0$  and  $c_2 \geq 0$  such that this is true. Express your answer in terms of  $n$ , and use 'ln' to denote the natural logarithm function, as in 'ln(3)'.

 $c_1 =$  


 $c_2 =$  


*You have used 1 of 2 submissions*


### DISCUSSION

Click "Show Discussion" below to see discussions on this problem.


**Unit overview****Lec. 14:  
Introduction to  
Bayesian inference**

Exercises 14 due Apr  
06, 2016 at 23:59 UTC 


**Lec. 15: Linear  
models with  
normal noise**

Exercises 15 due Apr  
06, 2016 at 23:59 UTC 


**Problem Set 7a**

Problem Set 7a due  
Apr 06, 2016 at 23:59  
UTC 


**Lec. 16: Least  
mean squares  
(LMS) estimation**

Exercises 16 due Apr  
13, 2016 at 23:59 UTC 

**Lec. 17: Linear  
least mean  
squares (LLMS)  
estimation**

Exercises 17 due Apr  
13, 2016 at 23:59 UTC 

**Problem Set 7b**

Problem Set 7b due  
Apr 13, 2016 at 23:59  
UTC 

**Solved problems****Additional  
theoretical  
material****Unit summary**

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