${\bf Contents}$

Pı	refac	e	v		
1	Introduction				
	1.1	Definition	1		
	1.2	BNP Models for Random Probability Measures	2		
		1.2.1 Species Sampling Models	2		
		1.2.2 Stick Breaking Prior	4		
		1.2.3 Product Partition Models	5		
		1.2.4 Pólya Trees	6		
		1.2.5 DDP	7		
		1.2.6 Completely Random Measures	7		
		1.2.7 NTR Priors	8		
		1.2.8 Indian Buffet Process	9		
	1.3	BNP Models for Random Functions	10		
		1.3.1 Gaussian Process	10		
			12		
		1.3.3 Basis Representation and Gaussian Process Priors	14		
2	Dat	a Analysis	15		
	2.1	·	15^{-1}		
	2.2	· · · · · · · · · · · · · · · · · · ·	 16		
		8	16		
			17		
			18		
	2.3	v e	18		
	2.4		19		
	2.5		20		
3	Dir	ichlet Process	23		
3	3.1		23		
	0.1		$\frac{23}{23}$		
			$\frac{25}{24}$		
	3.2	1	27 - 27		
	$\frac{3.2}{3.3}$		28		
	5.5		$\frac{20}{29}$		
			$\frac{23}{33}$		
		1	34		
			36		
	3.4		36		
	$\frac{3.4}{3.5}$		38		
	3.6		38		
	5.0		38		
			40		
		OUR COMMUNICATION DI COLOR COL	10		

iv CONTENTS

4	Pól	ya Trees	43			
	4.1	Definition	43			
	4.2	Posterior Inference	45			
	4.3	The Marginal Model	47			
	4.4	Mixtures of Pólya Trees	48			
	4.5	Multivariate Pólya Trees	49			
	4.6	Rubbery Pólya Tree	50			
5	Dependent Dirichlet Processes and Other Extensions					
	5.1	Dependent Extensions of the DP	53			
	5.2	Dependent DP (DDP)	54			
	5.3	AÑOVA DDP	55			
	5.4	Multilevel Modeling of Exchangeable RPMs	56			
		5.4.1 Weighted Mixtures of DPs	56			
		5.4.2 Hierarchical DP	60			
		5.4.3 Nested DP	62			
	5.5	DP Models for Time Course Data	65			
		5.5.1 Dynamic DP	65			
		5.5.2 Time Series DDP	66			
	5.6	Spatial DDP	68			
	5.7	Other Dependent Extensions of the DP	69			
		5.7.1 Probit Stick-Breaking Processes	70			
		5.7.2 Kernel Stick-Breaking Processes	74			
6	Dependent Tailfree Process and Dependent Multivariate PT 77					
	6.1	Linear Dependent Tailfree Process (LDTP)	77			
	6.2	Dependent PTs	77			
	•	6.2.1 Multivariate Beta Process	78			
		6.2.2 Dependent Multivariate Pólya Tree	80			
7	-	ccies Sampling Models	83			
	7.1	Introduction	83			
	7.2	Predictive Probability Functions	83			
	7.3	More SSMs	85			
8	Rar	ndom Partition Models	87			
	8.1	Introduction	87			
	8.2	Random Partition Models	87			
	8.3	Covariate-Dependent Clustering	89			
\mathbf{A}	ppen		93			
		Implementing DP Mixtures in R				
	A.2	Implementing PTs in R	100			
	Bibl	liography	104			