



NSSPW

Nonlinear Statistical Signal Processing Workshop 2006

Classical, Unscented and
Particle Filtering Methods



UNIVERSITY OF
CAMBRIDGE

13-15 September 2006

Corpus Christi College, Cambridge, UK

TABLE OF CONTENTS

A risk sensitive estimator for nonlinear problems using the adaptive grid method	1
<i>S. Bhaumik, M. Srinivasan, S. Sadhu, and T.K. Ghoshal</i>	
Efficient online inference for multiple changepoint problem	5
<i>P. Fearnhead and Z. Liu</i>	
Time-frequency analysis using particle filtering: closed-form optimal importance function and sampling procedure for a single time-varying harmonic	9
<i>E.E. Tsakonas, N.D. Sidiropoulos, and A. Swami</i>	
Performance analysis of a suprathreshold stochastic resonance based non-linear detector	13
<i>V.M. Roy and G.V. Anand</i>	
Estimation of signals in colored non Gaussian noise based on Gaussian mixture models	17
<i>R. Pradeepa and G.V. Anand</i>	
On Sequential Monte Carlo sampling of discretely observed stochastic differential equations	21
<i>S. Särkkä</i>	
Benchmarking nonlinear filters	25
<i>N. Sirola, S. Ali-Loytty, and R. Piché</i>	
Exact moment matching for efficient importance functions in SMC Methods	29
<i>S. Saha, P.K. Mandal, Y. Boers, and H. Driessen</i>	
The IGMARP data fusion algorithm	33
<i>A.R. Runnalls</i>	
Algorithm PP for Particle filtering within ellipsoidal regions	37
<i>A. Balestrino, A. Caiti, and E. Crisostomi</i>	
Model-based processing for a short towed array	41
<i>E.J. Sullivan, J.D. Holmes, and W.M. Carey</i>	
Towards Bayesian filtering on restricted support.	47
<i>L. Pavelkov, M. Kárný, and V. Šmídl</i>	
A Single Instruction Multiple Data particle filter	51
<i>S. Maskell, B. Alun-Jones, and M. Macleod</i>	
Online target tracking and sensor registration using Sequential Monte Carlo Methods	55
<i>J. Li, W. Ng, and S. Godsill</i>	
Particle filters for graphical models	59
<i>M. Briers, A. Doucet, S.S. Singh, and K. Weekes</i>	
Performance issues in non-Gaussian filtering problems	65
<i>G. Hendebay, R. Karlsson, F. Gustafsson, and N. Gordon</i>	
MIMO propagation parameter tracking using EKF	69
<i>J. Salmi, A. Richter, and V. Koivunen</i>	
Particle filters in a continuous time framework	73
<i>D. Crisan</i>	
On resampling algorithms for particle filters.	79
<i>J.D. Hol, T.B. Schön, and F. Gustafsson</i>	
Expectation propagation for inference in non-linear dynamical models with Poisson observations	83
<i>B.M. Yu, K.V. Shenoy, and M. Sahani</i>	
Entropy based adaptive particle filters	87
<i>S. Liverani and A. Papavasiliou</i>	
Filtering of neural signals for mental control of robotic prosthetic devices	91
<i>A.E. Brockwell</i>	
Joint driver intention classification and tracking of vehicles.	95
<i>J. Gunnarsson, L. Svensson, F. Bengtsson, and L. Danielsson</i>	
SMC Samplers for Bayesian optimal nonlinear design	99
<i>H. Kück, N. de Freitas and A. Doucet</i>	
Quantization based filtering method using first order approximation and comparison with the particle filtering approach	103
<i>A. Sellami</i>	
A new class of moment matching filters for nonlinear tracking and estimation problems	108
<i>M. Clark and R.B. Vinter</i>	
Distributed tracking with sequential Monte Carlo methods for manoeuvrable sensors	113
<i>M.H. Jaward, D. Bull, and N. Canagarajah</i>	
On tracking applications using variable rate particle filters.	117
<i>W. Ng, J. Li, S.K. Pang, and S. Godsill</i>	

Efficient parametric non-Gaussian dynamical filtering	121
<i>J. Loxam and T. Drummond</i>	
Application of the ensemble Kalman filter to atmosphere-ocean coupled model.	125
<i>G. Ueno, T. Higuchi, T. Kagimoto, and N. Hirose</i>	
Particle filtering for multiple object tracking in molecular cell biology	129
<i>I. Smal, W. Niessen, and E. Meijering</i>	
Exploiting signal nongaussianity and nonlinearity for performance assessment of adaptive filtering algorithms:	
Qualitative performance of Kalman filter	133
<i>M. Chen, T. Gautama, D. Obradovic, J. Chambers, and D. Mandic</i>	
Blind sequential extraction of post-nonlinearly mixed sources using Kalman filtering	137
<i>W.Y. Leong and D.P. Mandic</i>	
Particle filters for diffusions avoiding time-discretisations	141
<i>P. Fearnhead, O. Papaspiliopoulos, and G.O. Roberts</i>	
Sequential Monte Carlo approach to dynamic data-driven event reconstruction for atmospheric release	144
<i>G. Johannesson, K.M. Dyer, W.G. Hanley, B. Kosovic, S.C. Larsen, G.A. Loosmore, J.K. Lundquist, and A.A. Mirin</i>	
Exact and approximate Bayesian smoothing algorithms in partially observed Markov chains	148
<i>B. Ait-el-Fquih and F. Desbouvieres</i>	
Networks of maritime radar systems: Sensor selection algorithm for Pd<1 based on the modified Riccati equation.	152
<i>U.D. Ramdaras and F.G.J. Absil</i>	
Using noisy Georeferenced information sources for navigation and tracking	156
<i>J. Guillet and F. Le Gland</i>	
Using exponential mixture densities for suboptimal distributed data fusion.	160
<i>S.J. Julier, T. Bailey, and J.K. Uhlmann</i>	
Distributed self localisation of sensor networks using particle methods.	164
<i>N. Kantas, S.S. Singh, and A. Doucet</i>	
Mixture tracking of multiple fingers image in omnidirection camera for human friendly interface	168
<i>N. Ikoma, M. Sakata, and M. Doi</i>	
State-of-the-Art for the marginalized particle filter	172
<i>F. Gustafsson, T.B. Schön, R. Karlsson, and P.J. Nordlund</i>	
Predictive control of complex stochastic systems using Markov Chain Monte Carlo with application to air traffic control	175
<i>A. Lecchini, W. Glover, J. Lygeros, and J. Maciejowski</i>	
Particle filtering applied to robust multivariate likelihood optimization in the absence of a closed-form solution	179
<i>P. Closas, J.A. Fernandez-Rubio, and C.F. Prades</i>	
Cost-reference particle filtering for dynamic systems with nonlinear and conditionally linear states	183
<i>P.M. Djuric and M.F. Bugallos</i>	
Sequential learning methods on RBF with novel approach of minimal weight update	189
<i>V.S. Asirvadam and S.F. McLoone</i>	
Towards The Automatic Reconstruction of Dendritic Trees Using Particle Filters.	193
<i>D.R. Myatt, S.J. Nasuto, and S.J. Maybank</i>	
Online parameter estimation for partially observed diffusions	197
<i>G. Poyiadjis, S.S. Singh, and A. Doucet</i>	
Sigma-Point filters: An overview with applications to integrated navigation and vision assisted control	201
<i>E.A. Wan</i>	
Sequential inference for factorial changepoint models	203
<i>A.T. Cemgil</i>	
High-order multiple model channel and sequence estimation	207
<i>H. Kulatunga and V. Kadiramanathan</i>	
Ground target tracking with acoustic sensors using particle filters and statistical data associations	212
<i>M. Ekman and N. Bergman</i>	
Irreducible Markov Chain Monte Carlo schemes for partially observed diffusions	216
<i>K. Kalogeropoulos, G. Roberts, and P. Dellaportas</i>	
A sequential Monte Carlo EM solution to the transcription factor binding site identification problem.	220
<i>E.S. Jackson and W.J. Fitzgerald</i>	
The Restricted variational Bayes approximation in Bayesian filtering.	224
<i>V. Šmidl and A. Quinn</i>	
Deterministic and stochastic Gaussian particle smoothing	228
<i>O. Zoeter, A. Ypma, and T. Heskes</i>	
Monte Carlo methods for sensor management in target tracking	232
<i>C.M. Kreucher and A.O. Hero III</i>	