PhD seminar on

Bayesian networks and Bayesian hierarchical analysis in engineering

Exercises and materials for the exercises

21.10.09	Variability within multi-component systems (Shuoyun)	Material
		Kelly and Smith. (2009) Bayesian inference in probabilistic risk assessment. Reliability Engineering and System Safety, 94, pp. 628-643.
		Exercise
		Section 3 set up analysis and numerical example. Do closed form analysis and also winbugs analysis. Compare.
28.10.09	Spatial GLM networks and hierarchies (Katharina, Eva)	Material
		Banerjee, Carlin and Gelfand. (2004) Hierarchical modeling and analysis for spatial data. Chapman. **DOWNLOAD FROM: http://www.statsnetbase.com/books/1285/c410x_fm.pdf** Also: Geobugs user manual.
		Exercise
		Set up theoretical framework and draw the Bayesian networks
04.11.09	Spatial discrete hazards using HBM (Mathias)	Material
		Maes, M.A., Dann M., Sarkar S., and Midtgaard, A.K., (2007) Fatality rate modeling within a spatial network using hierarchical Bayes methods, Web-published in the Proceedings International Forum on Engineering Decision Making, IFED2007, Port Stephens, December. Ng, K., Hung, W. and Wong, W. (2002) Algorithm for assessing the risk of traffic accident. Journal of Safety Research, 33, pp. 387-410.
		Exercise
		Describe framework and example input and results. Expand to suggestions for real-time decision making applications
18.11.09	Spatial variability: classical vs Bayesian kriging (Tobias)	Material
		Diggle, P., Ribeiro, P.J. and Christensen, O.F. (2003) Chapter 2: An introduction to model/based geostatistics in Moeller Spatial statistics: in Spatial statistics and computational methods. Also: geobugs user manual
		Exercise
		Give overview and present an application.
25.11.09	Hazard modeling using BN and HBM (Juerg)	Material
		Straub, D. and Der Kiureghian, A. (2008) Improved seismic fragility modeling from empirical data, Structural Safety, 30, pp.320-336.
		Exercise

		Study the various components of the model and compare HBM and BN interpretations (focus on hazard aspects)
02.12.09	HBM for noisy/dirty data in integrity and lifetime extension assessment (Markus)	Material
		Maes, M.A., Faber, M.H. and Dann M.R., (2009). Hierarchical Modeling of Pipeline defect growth subject to ILI uncertainty, Proceedings, 27th Offshore Ocean and Arctic Engineering Conference, Honolulu, US, June, OOAE2009-79470, 12pp.
		Exercise
		Explain framework and analyze small example
09.12.09	HBM for environmental problems (Asif, Alex)	Material
		Ogle, K., Uriate, M. Thompson, J., Johnstone, J. Jones, A. Lin, Y., Mclntire, E.J.B. and Zimmerman, J.K. (2006) Chapter 6: Implications of vulnerability to hurricane damage for long-term survival of tropical tree species: a Bayesian hierarchical analysis: in Hierarchical modeling for the environmental sciences. Oxford University press.
		Exercise
		Explain framework and analyze small example
16.12.09	HBM for extremes – group project (Gerhard, Florian, Julia, Hari, Kay, Robert)	Material
		Maes ppt presentation is available. Use of 2 data sets. One by Kanda for extreme winds. One from NIST in the US. **DATA SETS IN 4 or 5 weeks.**
		Exercise
		Provided in due time