Charles Pearce Memorial Symposium - Abstracts

Dr Andrew Allison
University of Adelaide
We develop a method for systematically constructing Lagrangian functions for dissipative mechanical, electrical and, mechatronic systems. We derive the equations of motion for some typical mechatronic systems using deterministic principles that are strictly variational. We do not use any ad hoc features that are added on after the analysis has been completed, such as the Rayleigh dissipation function.

Dr Harvey Cohen
Aboriginal mathematics is expressed not just in the counting systems used, but in the schemes of social organisation developed, as well in the development of knots and in weaving designs. Early accounts failed to recognise the sophistication of aboriginal invention – and even lead to claims of their languages possessing only numbers for one and two, followed by small mob big mob claims that are now known to be false. Not until the mid twentieth century were the schema of kinship relationships, entailing cyclic groups, first recorded reliably by anthropologists. Knots and weaving structures were recorded earlier but mathematical significance was not recognised.

Professor Silvestru Sever Dragomir
Victoria University & University of the Witwatersrand
Some inequalities of Hermite-Hadamard type related to the book [S.S. DRAGOMIR and C.E.M. PEARCE, Selected Topics on Hermite-Hadamard Inequalities and Applications, RGMIA Monographs, Victoria University, 2000] will be presented.

Emeritus Professor Phil Howlett
University of South Australia
The fundamental equations for inversion of operator pencils on Banach space (joint work with Amie Albrecht and Charles Pearce): We prove that the resolvent of a linear operator pencil is analytic on an open annulus if and only if the coefficients of the Laurent series satisfy a system of fundamental equations and are geometrically bounded. Our analysis extends earlier work on the fundamental equations to include the case where the resolvent has an isolated essential singularity. We find a closed form for the resolvent and show that our results can also be applied to polynomial pencils.

Professor Graeme Wake
Massey University Auckland
Non-local calculus is the 'Cinderella' of today's curriculum. Yet these arise frequently in modelling. Also presumed 'non-local mechanisms' are a relatively simple way of describing complex behaviour. A few case studies will be outlined.

Dr Stephen Bourn
DSTO
A rudimentary knowledge of binomial coefficients and repeated Bernoulli trials was applied to develop a two stage stochastic process that helped to solve a practical military optimisation problem. The transformation, sporadically over a long time, of this piece of work into a PhD thesis, acceptable to the high standards of the supervisor Charles Pearce, will be presented.

Dr Penny Sanchez
Telstra
Some insight into a great mathematician. Charles Pearce inspired me at every level along my journey to become a mathematician, during undergraduate studies, honours, my PhD and during my early career. He inspired me to achieve my potential and overcome obstacles and I wish to share a few words to honour his wisdom and experience.

Professor Roger Hosking
University of Adelaide
Trans-Tasman Mathematical Connexions (On Cold Regions and Modern Railtracks) Floating ice sheets are often exploited by land-based vehicles and as aircraft runways, but a moving load can produce dangerous ice deflexions. A modern rail design (the floating ladder track) has provided reduced vibration and noise in urban transport, but can it be safe at high train speeds? Mathematical models have been used to successfully address these issues.

Dr. Raymond Kennington
A new type of inclusion-exclusion formula is provided for the probability distribution of the mini-max value of a function defined on events in a finite discrete sample space. Combined with a special condition, this enables complex distributions and their moments to be calculated as a linear combination of those a simple process. Applications to a car parking model and its natural generalisation, to 2-D & 3-D zig-zagging models, and to the 40-D game SET.

Bruce Northcote
TRC, University of Adelaide
Putting Teletraffic theory to work: Charles and his research group affiliates were always proposing new teletraffic models. The TRC puts them to work in real network operations. Here are some examples of successful implementation.

Dr Jadranka Sunde
DSTO
Population statistics, such as marital distance, estimating generation length and twining rates were some of the things Charles and I were working on. My last email exchange with Charles was on possible ways of testing some of his models developed for Maori genealogy on a set of data for a small village on Dalmatian

cost of Croatia. I will present some of the results, and also some of pretty graphs developed to visualise multiple relationships.

Professor Phil Pollett
University of Queensland
Quasi-stationary distributions: If it were not for Charles Pearce my sample behaviour would have been entirely different. He was an inspirational lecturer. His honours course on stochastic processes began with an exploration of the 'Vere-Jones Theory' of quasi-stationary distributions, an area which has occupied much of my time since the mid-80s. I will present some recent developments and give some new historical perspectives.

Dr Andrew Eberhard
RMIT
Charles Pearce - Some recollections of an Extraordinary Life: I will try and summarise some milestones of Charle's life and include some personal recollections that Charles had conveyed to me of these events during the numerous discussions we had as friends. So this talk will be a combination of discussions and facts from his CV about his time in Australia and NZ.