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**Tyrone E. Duncan\*** (duncan@math.ku.edu), Mathematics Department, Snow Hall, 1460 Jayhawk Blvd., Lawrence, KS 66045. *Some Solvable Stochastic Control Problems*. Preliminary report.

Some stochastic control problems are explicitly solved by providing optimal controls and optimal costs. These problems are solved by a generalization of the method of completion of squares from elementary algebra. This method provides directly optimal controls and optimal costs. This method is more elementary and more direct than the well known methods of solutions of Hamilton-Jacobi-Bellman equations and the application of the stochastic maximum principle. The stochastic control problems that are solved include finite dimensional controlled linear stochastic systems driven by arbitrary continuous stochastic processes and having quadratic cost functionals, controlled linear stochastic equations in an infinite dimensional Hilbert space with fractional Brownian motions having the Hurst parameter in the interval  $(1/2,1)$ , linear stochastic systems in finite or infinite dimensional spaces with Brownian motions and costs that are exponentials of quadratic costs, the control of a Brownian motion in the two-sphere and the control of a Brownian motion in the real hyperbolic plane. Some of these results are joint work with B. Maslowski and B. Pasik-Duncan. (Received August 22, 2012)