1056-81-766   **Steven A. Bleiler** (`bleilers@pdx.edu`), Department of Mathematics and Statistics, Portland State University, PO Box 751, Portland, OR 97207-0751, and **Faisal Shah Khan*** (`faisal@pdx.edu`), Department of Mathematics and Statistics, Portland State University, PO Box 751, Portland, OR 97207-0751. *Proper quantization of multiplexer circuits, history dependent Parrondo games, and certain Markov processes.*

In the context of quantum information theory, "quantization" of various mathematical constructions is said to occur upon the replacement, at various points in the construction, of the classical randomization notion of probability distribution with the higher order randomization notion of quantum superposition and measurement. For this to be done "properly" one requires that there exist a faithful copy of the original construction within the new "quantum" one, just as is done when one wishes to extend a function to a larger domain. How exactly to accomplish this for the multiplexer circuit of logic synthesis, the history dependent Parrondo game, and for certain Markov processes has been an open problem for some time. A common solution is described herein. (Received September 17, 2009)