1067-Z1-1039 **Lilinoe M. Harbottle*** (lmharbottle@csupomona.edu), Cal Poly Pomona, 3801 West Temple Avenue, Department of Mathematics and Statistics, Pomona, CA 91768, **Blake Hunter** (blakehunter@math.ucdavis.edu), University of California, Davis, Department of Mathematics, One Shields Avenue, Davis, CA 95616, and **Alan Krinik** (ackrinik@csupomona.edu), Cal Poly Pomona, 2801 West Temple Avenue, Department of Mathematics and Statistics, Pomona, CA 91768. *The General, Irreducible Three and Four-State Markov Process.*

When introducing Markov processes, the natural first example that students learn is the two-state Markov process. This simple example is important for illustrating both the meaning and how to find steady state distributions and transient probability functions. One might think that the next most elementary examples of Markov processes would be the three or four-state Markov processes. However, this is not usually the case. In fact, the solution of the general, irreducible three-state Markov process does not (as far as we know) appear in introductory texts on Markov processes.

To address this gap in the pedagogy of Markov process, we present a solution method and formulae for the steady state distribution and transition probably functions of the general, irreducible three and four-state Markov process. The structure of the formulae illustrates some interesting connections between steady state and transient behavior. The solutions have been programmed which facilitate quick comparisons between different models of Markov processes. The analysis also has consequences for systems having more than three or four states. Hopefully, these simple examples will assist students to develop a better understanding of Markov processes. (Received September 17, 2010)