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Jeffrey Yeh* (jeffreyyeh@cpp.edu), CA, and **Malachi C. Demmin, Lyheng Phey, Tanner J. Thomas, Steven L. Marquez** and **Brittney A. Marian.** *Generalized Ballot Box*

Problem. Preliminary report.

The traditional two-candidate ballot box problem asks for the probability that candidate A is never behind candidate B during the counting of n ballots, where n is a positive integer. Candidate A is known to have an i -vote lead over B at the beginning of the ballot counting and A is assumed to have won the election with a j -vote margin of victory over B where i, j are non-negative integers. This traditional problem dates back to the 19th century and has an elegant solution when voters are presumed to have independent, equal chance of voting for A or B. In our presentation, the two-candidate ballot box problem is generalized by assuming that voters follow a simple type of birth-death Markov chain in casting their votes. Under our assumptions, a formula for the probability that candidate A is never behind candidate B during the counting of n ballots is determined in terms of known, exact expressions for eigenvalues of a class of transition matrices which depend upon n . Examples are presented and different solution forms are compared as time allows. (Received August 29, 2018)