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Kevin M. Woods* (kwoods@math.berkeley.edu), Department of Mathematics, University of California, Berkeley, CA 94720. *Using neighborhood complexes to compute rational generating functions.*

As an illustrative example, we examine the following question: “Given two denominations of stamps, a cents and b cents, where a and b are relatively prime, what postal rates can we pay exactly?” This set can be encoded compactly as a generating function defined to be the sum $\sum_c x^c$, as c varies over all rates that can be paid exactly. Computing the generating function allows us to answer questions like “What is the highest postal rate that cannot be paid?” (the Frobenius problem) and “How many postal rates cannot be paid?” We will show how a natural simplicial complex, called the neighborhood complex, allows us to compute this generating function as a rational function. This is a special case of a general phenomenon: using a neighborhood complex, we can compute the generating function for the set defined to be the projection of the set of integer points of a polyhedron. This builds on joint work with Herb Scarf. (Received September 28, 2005)