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**Programming Mathematica to find normal mode frequencies for a system with a large number of degrees of freedom** GREGORY BEUHLER, CHRIS MURRELL, BRETT CASWELL, HUNTER CLOSE, Texas State University-San Marcos — Imagine a system of  $N$  masses alternating with  $N+1$  springs in a line between two walls, with all motion constrained to the line. This system has  $N$  normal modes, each with its own frequency. Using only basic knowledge of programming principles, we developed a program in Mathematica that allowed us to generate the frequencies of these normal modes for any value of  $N$ , including large  $N$ . In this talk we present the specific strategy, structure, and products of the program. In particular, we defined a function for filling matrices and used nested loops to extract relevant data. In a companion talk, we present physical arguments for patterns we observed in the sets of frequencies.

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