1163-15-851 **Alan Krinik** (ackrinik@cpp.edu), Mathematics & Statistics, Cal Poly Pomona, 3801 West Temple Avenue, Pomona, CA CA 91768, and **Gerardo Rubino*** (gerardo.rubino@inria.fr), Campus de Beaulieu, 35042 Rennes, France. *The power-dual and the exponential-dual of a matrix.* Preliminary report.

In this talk we introduce two transformations of a matrix M into a new matrix, its power-dual $\mathrm{pd}(M)$ and its exponential-dual $\mathrm{ed}(M)$. Their interest is that the powers of M (resp. its exponential $\exp(M)$) can be obtained by evaluating those of its power-dual (resp. that of its exponential-dual). The cost of finding, for instance, $\exp(M)$ in terms of $\exp(\mathrm{ed}(M))$, is low (linear). Matrix M can be finite or infinite. These concepts were born as improved versions of the pseudo-dual of a matrix that the authors introduced recently, itself a generalization of the dual as defined by Sigmund and developed by Anderson in the context of Markov processes. The main applications so far have been in Markov chain analysis, but the transformations presented here are general, they cover any kind of linear differential system or of linear difference equations. In the talk, we will describe how they can make the evaluation of powers or of exponentials easier than working with the original matrix. Examples will also include a few cases in queueing theory. (Received September 13, 2020)