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How distinguishable are two quantum processes? a.k.a. What is the error rate of a quantum gate? ROBIN BLUME-KOHOUT, Sandia National Laboratories — I will try to convince you that the two titles of this talk are, in fact, synonymous that error rate and distinguishability of quantum processes are the same thing. Whether or not I succeed, I will go on to discuss (1) the various ways that this has been quantified, (2) the state of the art in doing so, and (3) why Im not (and you shouldnt be) satisfied. Having spent most of my time just establishing what the right problem is, I will then propose to solve it by sandwiching distinguishability between distillable distinguishability and distinguishability of formation. To demonstrate the utility of this approach, Ill prove that the diamond norm is not always the right measure of distinguishability (or even close to it!). I will then do a 180-degree turn and argue that for most of the case that we care about, the diamond norm is a good measure of distinguishability, and finally conclude with another 180-degree turn in which I argue that maybe its not.

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