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Pursuant to the theme of this special session, understanding of the role of noise in computational topological measurements, we give a recent result in the theory of persistent homology that can be used to rigorously track noise introduced in the computation of persistence diagrams. We illustrate the use of this analytical framework by looking closely at common approximation techniques such as sub-sampling and discretization, and through other operations in, e.g. image processing, such as image smoothing. In each case, we contrast this result with the typical formulation of uniform errors achieved in terms of the Bottleneck distance, which can be seen as a type of sup-norm on the space of persistence diagrams. (Received September 18, 2016)