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Extreme Value Theory for Observations

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We study the properties of recurrence of a smooth observable computed along a trajectory of a chaotic system near a particular value of interest . Using the framework of Extreme Value Theory, we are able to derive a limit law which is a Gumbel distribution whose parameters relate to the dimensions of the image measure. We show that this approach allows to have access to the fine structure of the attractor, by using directly observational data. In particular, we are able to compute local dimensions associated to the underlying attractor whenever the dimensionality of the observable is larger than the dimension of the attractor.