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# Identifying damage functions through density transformation

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In order to estimate future damage caused by natural disasters, it is desirable to know the damage caused by single events. So called damage functions provide - for a natural disaster of certain magnitude - a specific damage value. However, in general, the functional form of such damage functions is unknown. We study the distributions of recorded damage values and deduce which damage functions lead to such distributions when the natural disasters obey Generalized Extreme Value statistics. We find broad damage distributions and investigate two possible functional forms to characterize the data. In the case of Gumbel distributed extreme events, (i) a power-law distribution density with an exponent close to 2 (Zipf's law) implies an exponential damage function. (ii) Stretched exponential distribution densities imply power-law damage functions. In the case of Weibull (Frechet) distributed extreme events we find correspondingly steeper (less steep) damage functions.