

We present a class of stochastic models connected with the joint distribution of (X,Y,N) , where N is a deterministic or random integer while X and Y are, respectively, the sum and the maximum of N random variables, independent of N . Models of this form, particularly with random N , are desirable in many applications, ranging from hydro-climatology, to finance and insurance. Our construction is built upon a basic model involving a deterministic number n of IID exponential variables, where the basic characteristics of the joint distribution of (X,Y) admit explicit forms. We describe this special case in detail, and proceed with generalizations going beyond the exponential distribution and/or the IID assumption. One particular model we shall present involves the sum and the maximum of dependent, heavy-tail Pareto components. Another example with geometrically distributed N , representing the duration of the growth period of the daily log-returns of currency exchange rates, will be used to illustrate modeling potential of this construction. This research was partially carried jointly with M. Arendarczyk, F. Biondi, A.K. Panorska, K. Podgorski, and F. Qeadan.