Limit processes with independent increments for the Ewens sampling formula. (English. English summary)


The Ewens sampling formula [W. J. Ewens, Mathematical population genetics, Springer, Berlin, 1979; MR 81f:92019] induces a measure on the set of vectors \((k_1, \ldots, k_n)\) of non-negative integers such that \(\sum_{i=1}^n ik_i = n\). The probability function is defined by

\[
p(k_1, \ldots, k_n) = \frac{n!}{\theta(\theta+1) \cdots (\theta+n-1)} \prod_{i=1}^n \left(\frac{\theta}{j}\right)^{k_i} \frac{1}{k_i!}
\]

for some \(\theta > 0\).

It is shown that the sequence of certain dependent sums involving functions of \(k_j\) converges weakly to a process of independent increments in the space \(D[0,1]\) endowed with Skorokhod topology. This extends results due to J. C. Hansen [J. Appl. Probab. 27 (1990), no. 1, 28–43; MR 91b:60027] and the authors [Sankhyā Ser. A 61 (1999), no. 3, 312–327; MR 2001j:60016], where the limit processes were Brownian motions. An example is given when the limit process is a homogeneous Cauchy process.  

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