

# Re: How Chapman–Kolmogorov implies Markov ??

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- *From:* "Edward Green" <[spamspamspam3@xxxxxxxxxxxxx](mailto:spamspamspam3@xxxxxxxxxxxxx)>
  - *Date:* 10 Feb 2007 07:37:48 –0800
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On Feb 9, 7:56 am, "rayoha...@xxxxxxxxxxxxx" <[juanp...@xxxxxxxxxxxxx](mailto:juanp...@xxxxxxxxxxxxx)> wrote:

It's easy to see that a stochastic process that follows the Markov property, then follows the Chapman–Kolmogorov equation. But the visce versa holds too, and I can find a proof of that. Some one of you can show me a proof ??

Before you fade back into obscurity, perhaps you would help me understand the question.

Starting with

[http://en.wikipedia.org/wiki/Chapman–Kolmogorov equation](http://en.wikipedia.org/wiki/Chapman–Kolmogorov_equation)

I run into some conceptual problems. An "indexed set of random variables" is almost an empty concept, being, I suppose, a set of random variables each identified with an associated element of an index set. Perhaps the notation " $f_i$ " is supposed to imply there is something equivalent about all of these random variables, though what this is is undefined. Identical marginal distributions?

Now, when we begin labeling a set of the indexes, " $i_1, i_2, \dots, i_n$ ", I get lost. We have in mind again, of course, an almost empty concept, that we index the index set itself, or else write a finite sequence in it, explicitly using the integers as our indices.

It occurs to me now (for the first time? well... experience is infinite/life finite), that indexing a set by the integers and writing a sequence in it are related but distinct concepts: the sequence may reuse elements, while indexing implies a one-to-one relation — we don't say "oh,  $x_3$  and  $x_7$  are the same variable... did I forget to mention that"?

Which is intended?

Anyway, I get the feeling, not unknown in mathematical arguments, that the formal exposition has run ahead of the sense — the author knows

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what he is trying to capture, I don't! Rather than trying to reverse engineer his intentions through the ambiguities, would you possibly be so kind as to fill in story?

Please assume I am just sophisticated enough to understand the intention, though not conversant with it.

(P.S. Thanks for posting a real question, anyway)

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