

Re: How to create conditional correlated random values given exogenous data

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- *From:* "Reef Fish" <large_nassua_grouper@xxxxxxxxxx>
 - *Date:* 7 Nov 2006 10:25:00 -0800
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Bob wrote:

I just want to comment on the single word "structure" in "correlation structure". Just exactly what IS a correlation structure?

If I tell you that X and Y have ZERO correlation, and I give you 100 points (any 100 you choose) inside a unit square from the origin, to sprinkle on the X-Y plane to characterize the ZERO -correlation structure, can you do it? What do you envision to be that correlation "structure"?

I'm not sure whether I get to the point of your answer. With correlation structure I mean the covariance matrix. And if your variables X and Y are uniformly distributed the X-Y-plane should be evenly filled.

I also mean the covariance matrix. What you said is a one-way implication. When you ask about the structure, you are trying to draw an inference from the OPPOSITE direction.

What I am saying is that if I tell you X and Y have zero correlation, and you draw the conclusion that the points resemble evenly filled points on the unit square, then you are a "damned fool" :-)
The REVERSE inference does NOT hold.

I had a ready made example that you can take X and Y to have ANY distribution, any correlation (ANY STRUCTURE) on the X-Y plane. When you fit a linear regression of Y on X, the FITTED values and the RESIDUALS of that regression will ALWAYS have zero correlation.

The scatter of residuals versus fitted is anything BUT points scattered evenly on the fitted-residual plane!

Try this for size. :-) I had used the same for several different subjects in this group already:

Y FITTED RESIDU

*** ***** **

1 -11 12
4 3.5527E-15 4
9 11 -2
16 22 -6
25 33 -8
36 44 -8
49 55 -6
64 66 -2
81 77 4
100 88 12

The correlation between FITTED and RESIDU is zero of course.

You can see the definite pattern in the residuals because of the poor fit. ++-----++ nothing random about them.

By the same reasoning, the STRUCTURE of the points could be "virtually" anything for the correlation to be zero.

Random scatter (shot gun blast) ==> zero correlation

zero orrelation ==> does NOT imply ==> random scatter.

That was what I was trying to convey to you about your use of "structure". I think you're trying to dfaw the inference about the scatter that you are not entitled to, based on the value of correlation coefficients (any given value).

-- Reef Fish Bob.

This is a very serious question relating to what you are asking.
Perhaps
if you realize how miserably you will FAIL in characterizing a zero correlation structure, that you will not find ANY structure to characterize
points that will have a structure of any value, and perhaps then think of
some other ways of asking your question to chieve what you really wat to do.

-- Reef Fish Bob,