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The Explanatory Role of Causal Models in Complex Systems

Some features of some complex systems can be explained without reference to specifics at the micro-level. This is not surprising or new – such explanations are readily available in statistics even for non-complex systems. A more contentious claim is that supplementing such macro-level explanations with explanations using system-specific models is not only unnecessary, but counter-productive. Although this claim is also not new – the famous inability of a square peg to go through a round hole is one example – there has been renewed interest when complex systems are involved. Part of the difficulty in addressing the claim stems from an attachment to reductive explanations, which misrepresents the relation between the macro-level and the micro-level explanations. Building on the arguments in my forthcoming paper `Explanation as Condition Satisfaction', I shall explore this issue using attempts to find the causes of power law distributions for various phenomena that occur in complex systems. Finally, the relations between causal and non-causal explanations at different levels of abstraction will be discussed.