

Abstract Submitted  
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**Mathematical Constraint on Realistic Theories** JAMES FRANSON,  
University of Maryland at Baltimore County — We consider realistic theories in which some physical property  $f(\mathbf{r},t)$  is assumed to exist regardless of whether or not we measure it. It is shown that the value of  $f(\mathbf{r},t)$  at position  $\mathbf{r}$  and time  $t$  is completely determined by its value at all other locations  $\mathbf{r}'$  and earlier times  $t' < t$  provided that  $f(\mathbf{r},t)$  has continuous second partial derivatives [1]. Mathematical functions of this kind are sufficiently general to describe many situations of physical interest. These results are based on a mathematical identity that is similar in some respects to Cauchy's integral theorem and it can be viewed as a generalization of Green's third identity. The physical implications of weak determinism of this kind will be discussed and it will be contrasted with the properties of quantum systems.  
[1] J.D. Franson, arXiv: 1007.1941.

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