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Defining all networks that can achieve biological functions MALACHI TOLMAN, Brigham Young University - Prove, MARK TRANSTRUM, BYU Professor — In systems biology it is common to study networks of biochemical reactions in order to understand the role those reactions play in carrying out a biological function. A central question is then, how is the network topology related to the particular function. We consider the question: given a biological function, how to identify all possible topologies that can accomplish that function. Our approach leverages recent advances in model reduction. We begin with a fully connected network topology and fit it to artificial data corresponding to a particular function. We then perform model reduction to remove irrelevant edges from the network. The result is a minimal network that can carry out that function.

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