

## Coexistence of Multistability and Biphaseic Dose Responses in basic biochemical building blocks

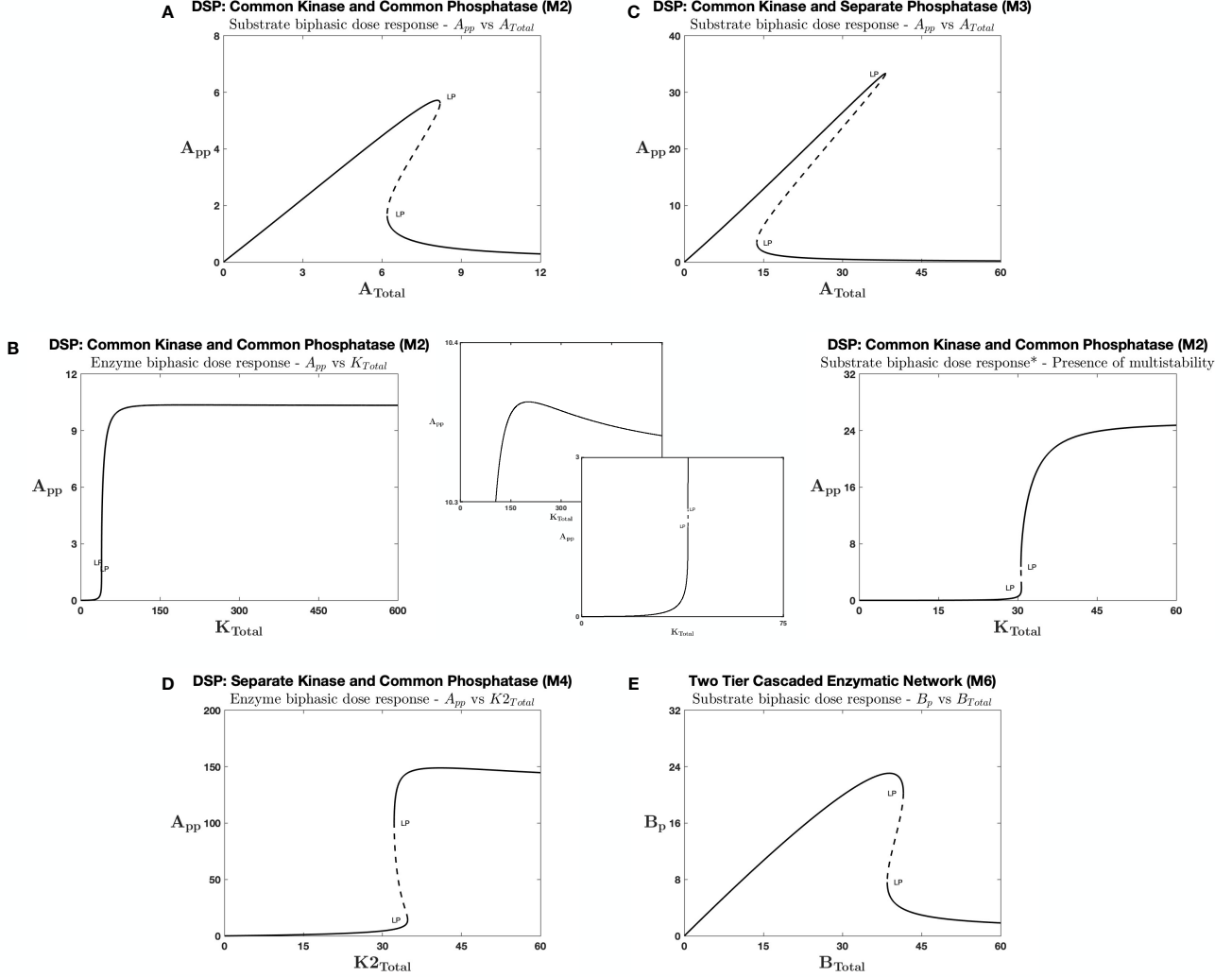


Figure 2 – figure supplement 1: **Coexistence of multi-stability and biphasic dose response in various enzymatic models for the same underlying kinetic regime.** The above panels illustrate computational evidence of the possibility of coexistence of biphasic response with multi-stability, in a 1D bifurcation along the respective dose (for the same/similar underlying kinetics), for the different networks considered. The results are shown for all models capable of biphasic response (from within our study) and multistability. Note that coupled covalent system (with common kinase) while capable of substrate biphasic is incapable of multistability. A. DSP with common kinase and phosphatase: Substrate biphasic response and multistability for the same underlying kinetics. B. DSP with common kinase and common phosphatase: Enzyme biphasic response and multistability - for different (but close) parameter regimes. Inset plots show magnified regions from the main figure. C. DSP with common kinase and separate phosphatase. Substrate biphasic response and multistability for the same underlying kinetics. D. DSP with separate kinase and common phosphatase. Enzyme biphasic response and multistability for the same underlying kinetics. E. Two tier cascaded enzymatic network. Substrate biphasic response and multistability for the same underlying kinetics. This shows how the enzymatic modification mechanism (and the associated sequestration and non-linearity in interaction) within these networks allows for not just the capacity to present biphasic dose response behavior but also to be present in conjunction with other qualitative signaling behaviors. [LP: saddle node bifurcation, solid and dotted lines denote stable and unstable steady states respectively]