

The Total Quasi-Steady-State Approximation for Fully Competitive Enzyme Reactions

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Abstract. The validity of the Michaelis-Menten approximation for single enzyme reactions has recently been improved by the formalism of the total quasi-steady state assumption. This approach is here extended to fully competitive systems, and a criterion for its validity is provided. We show that it extends the Michaelis-Menten approximation for such systems for a wide range of parameters very convincingly, and investigate special cases. It is demonstrated that our method is at least roughly valid in the case of identical affinities. The results presented should be useful for numerical simulations of many *in vivo* reactions.