Carsten Conradi* (carsten.conradi@htw-berlin.de), HTW Berlin, Wilhelminenhofstr. 75 A, 12459 Berlin, Germany. On the existence of Hopf bifurcations in the double futile cycle.

Protein phosphorylation cycles are important mechanisms of the post translational modification of a protein and as such an integral part of intracellular signaling and control. We consider the sequential phosphorylation and dephosphorylation of a protein at two binding sites known as the double futile cycle. While it is known that networks where phosphorylation is processive and dephosphorylation is distributive admit oscillations arising from a supercritical Hopf bifurcation (for some value of the rate constants and total concentrations) it is not known whether or not this is the case for the double futile cycle (where both phosphorylation and dephosphorylation are distributive). We study four simplified mass action models of the double futile cycle and show that for each of those there do not exist rate constants and total concentrations where a Hopf bifurcation occurs. To arrive at this result we use convex parameters to parameterize the steady state and Yang’s Theorem. (Received July 16, 2019)