Correlations of Coupled Logistic Maps JOHN HARRISON, RICHARD TAYLOR, GUS HART, Brigham Young University — Many systems in the world are non-linear and therefore often chaotic. Moreover, many systems influence or are influenced by other physical systems. That is, systems are often coupled to other systems. In an effort to uncover the fundamental issues of coupled systems, we have studied a system of coupled logistic maps. The logistic map, arguably the simplest chaotic system, shows unusual correlations when coupled to a second logistic map. We use a master–slave coupling, where the first map influences the second, but not the other way around. At low coupling strengths the correlations are complex but the two maps do not completely synchronize. At higher coupling strengths, the two maps "lock", becoming synchronized. The value of coupling that causes the two maps to lock can be determined analytically. Intriguingly, at intermediate couplings strengths, periodic forcing by the master can result in chaotic behavior in the slave.

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