

Supplementary Results of GENAVOS

Imperialist Competitive Algorithm Parameters

Supplementary Table 1: Imperialist Competitive Algorithm Parameters

Parameter	P_R	$L-U$	N_{it}	N_{pop}	N_{imp}	Beta	Zeta
Value	0.3	0-100	1000	100	8	0.2	0.1

A) Results of Primary Skin Fibroblasts Cell Cycle

A.1 Numerical Solution

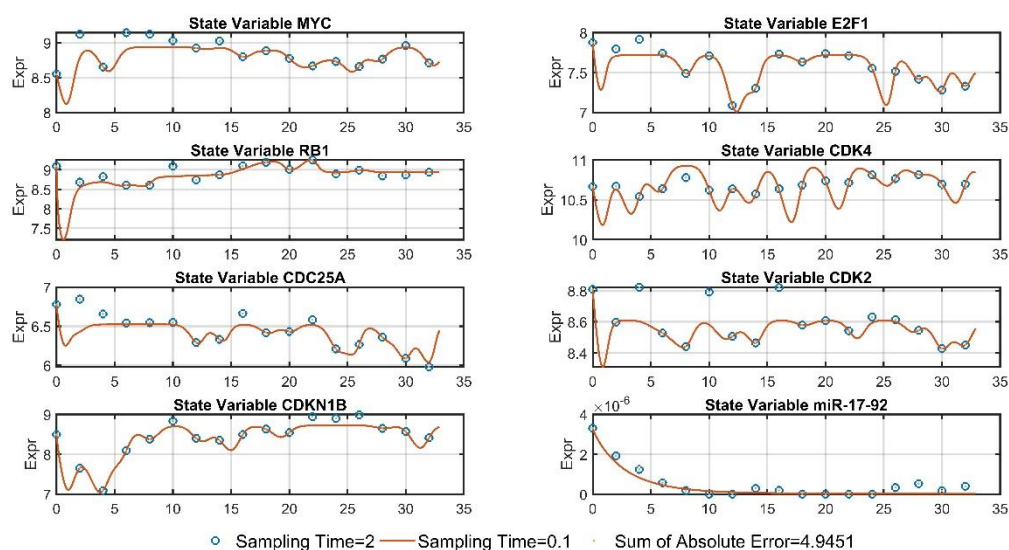


Figure 1 Modeled gene expression signals with real data points. Actual data points are marked with a circle.

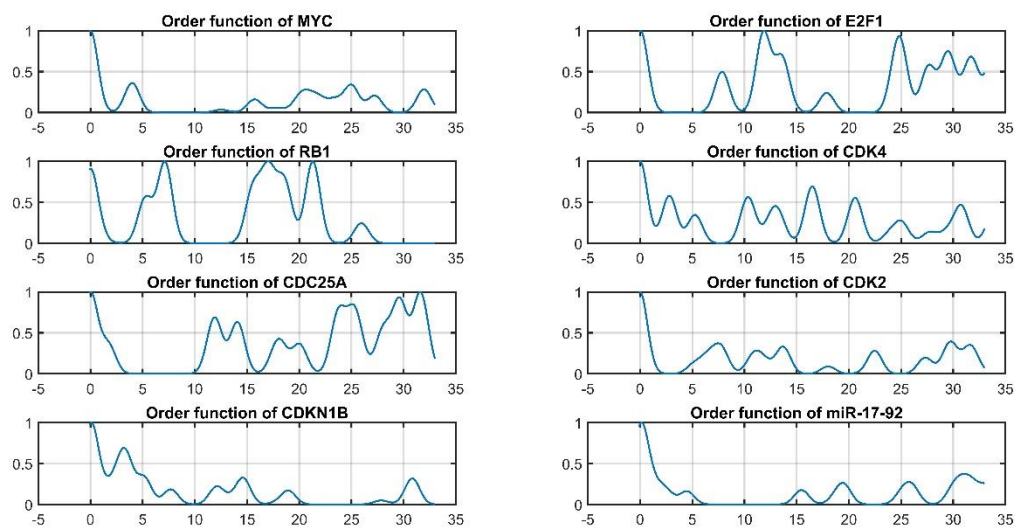


Figure 2 Variable order function

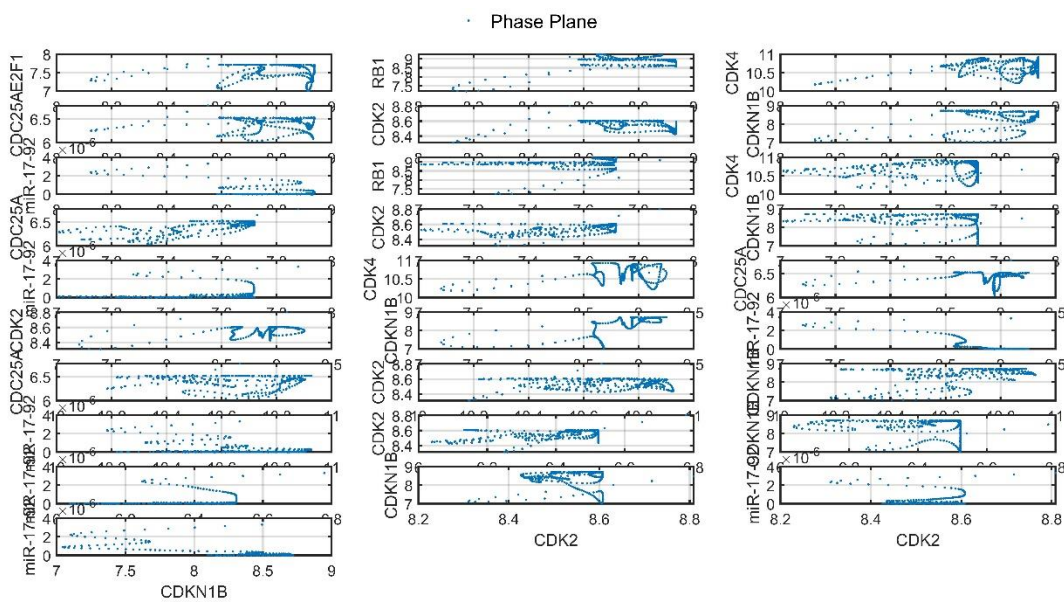


Figure 3 Phase Plane diagrams

A.2 Parameter Variation

Delay parameter effects

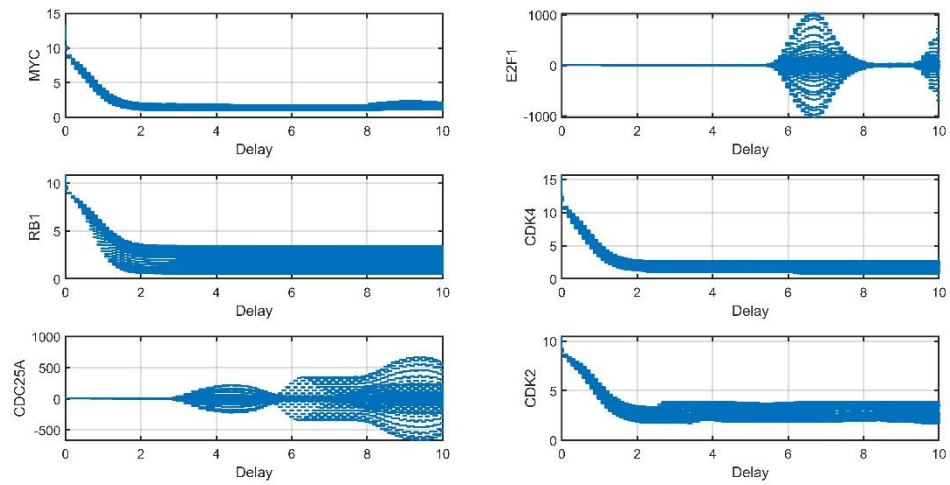


Figure 4 Bifurcation diagram for changing delay parameter

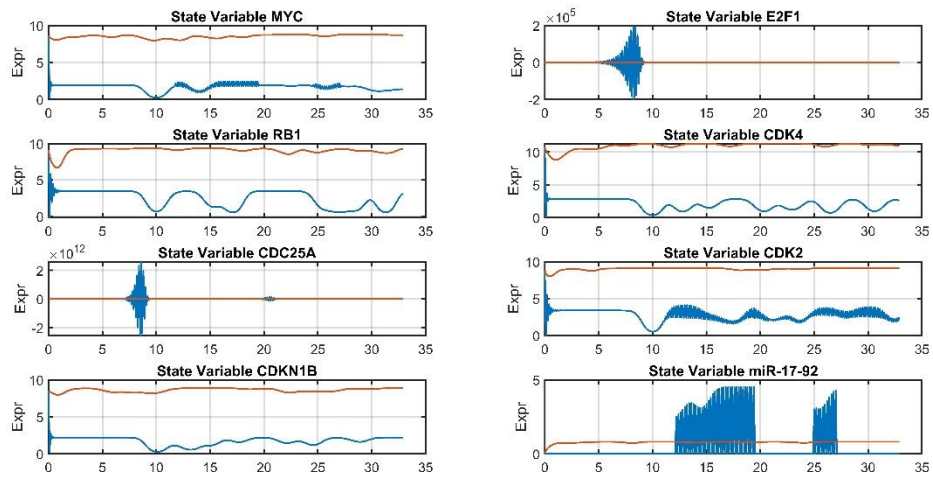


Figure 5 System response to Delay=10

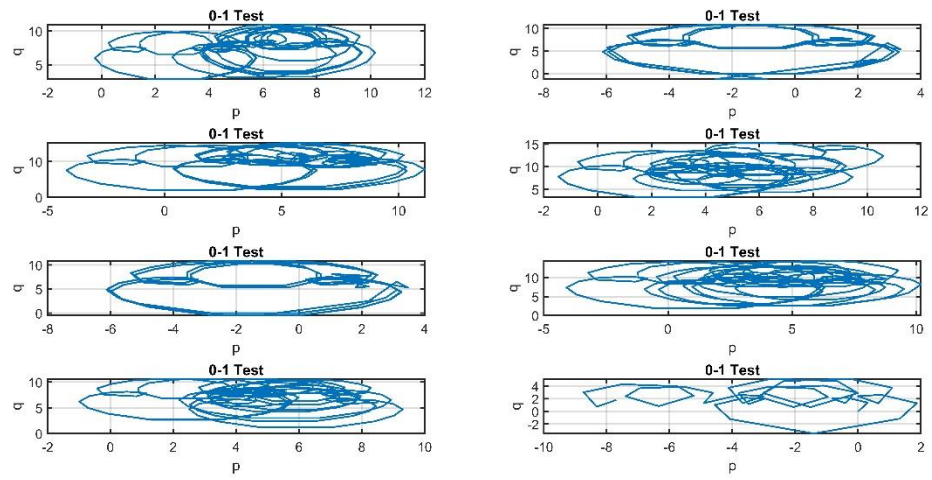


Figure 6 P-Q plot for Delay = 10

Variable order parameter effects

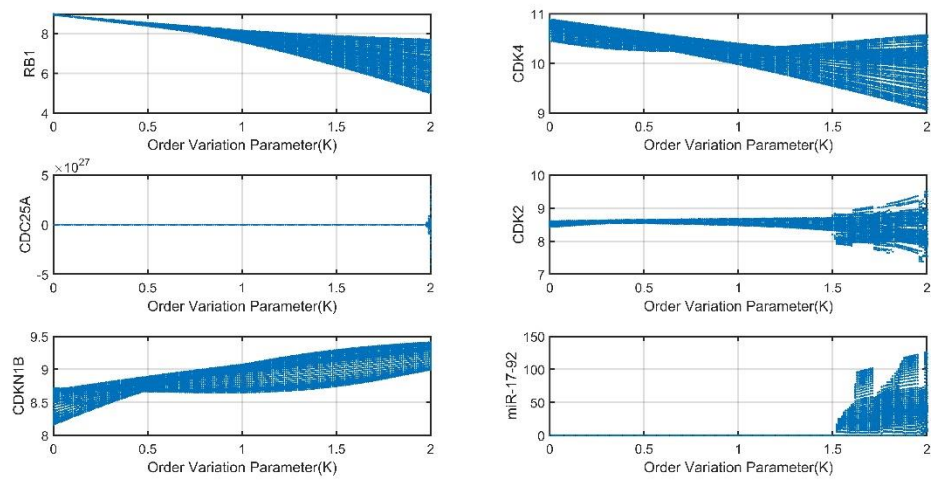


Figure 7 Bifurcation diagram for changing variable order parameter

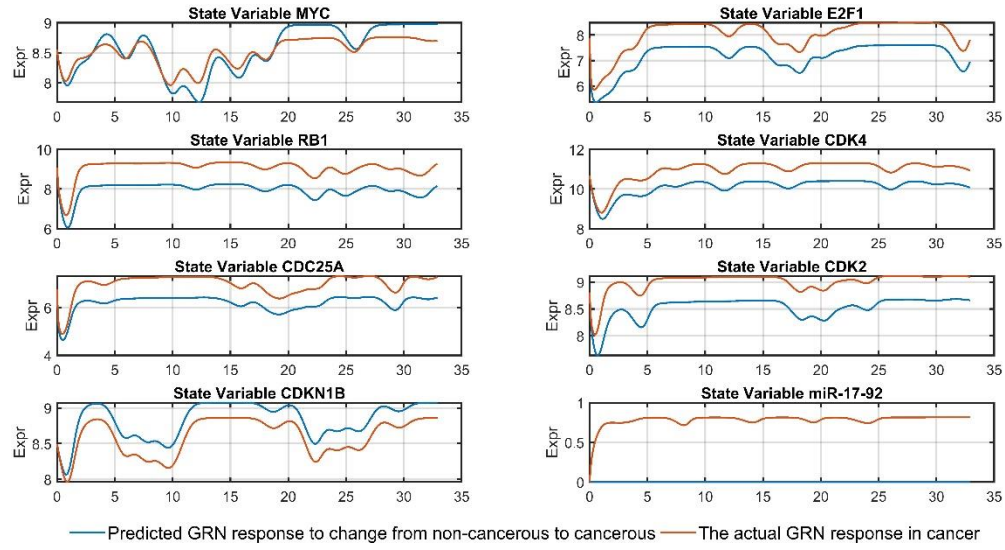


Figure 8 System response to $K=1$

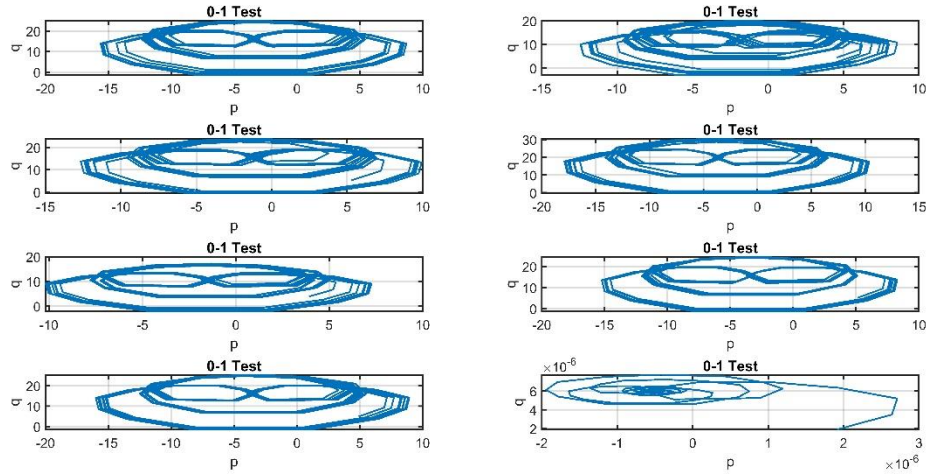


Figure 9 P-Q plot for $K=1$

MiR-17-92 Degradation parameter γ_8 effects

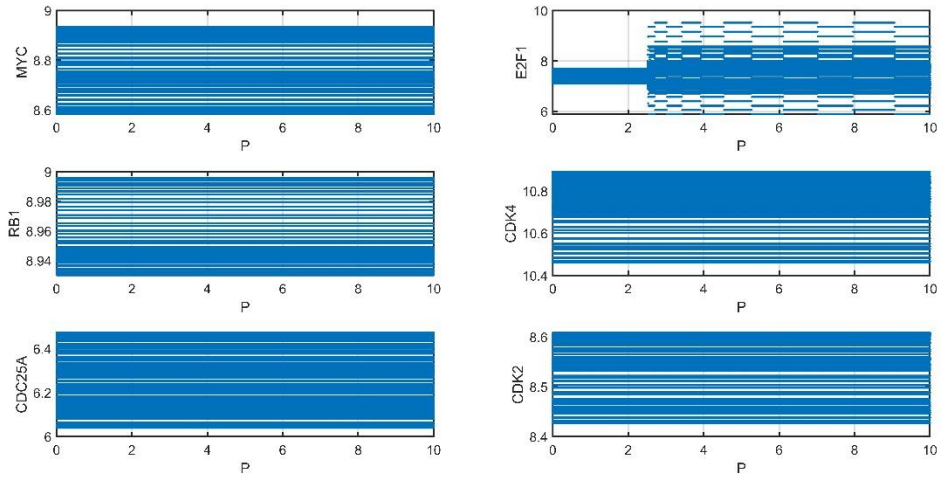


Figure 10 Bifurcation diagram for changing miR-17-92 Degradation parameter γ_8

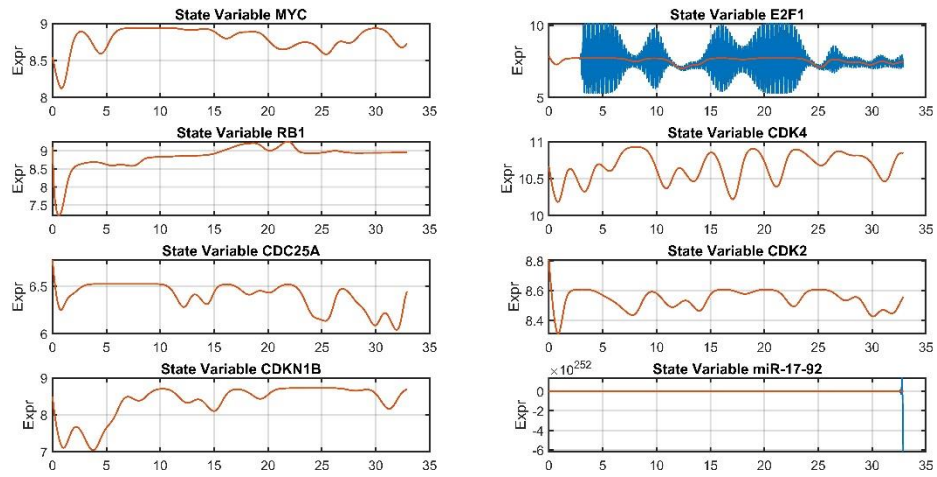


Figure 11 System response to miR-17-92 Degradation parameter =10

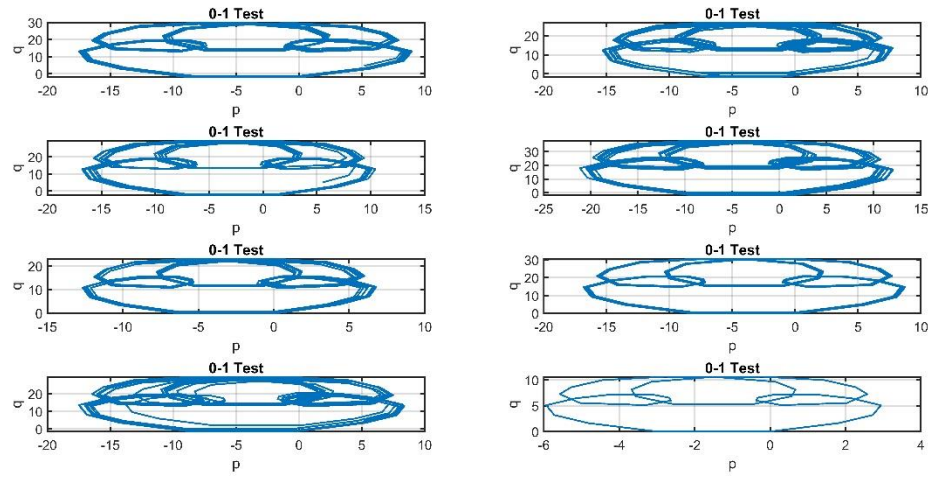


Figure 12 P-Q plot for MiR-17-92 Degradation parameter =10

Effects of MYC Synthesis Rate κ_1

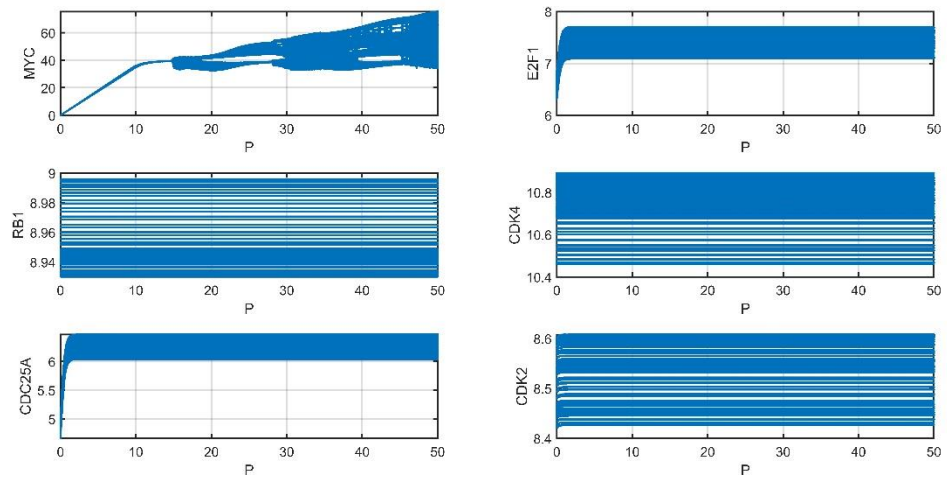


Figure 13 Bifurcation diagram for changing MYC Synthesis Rate κ_1

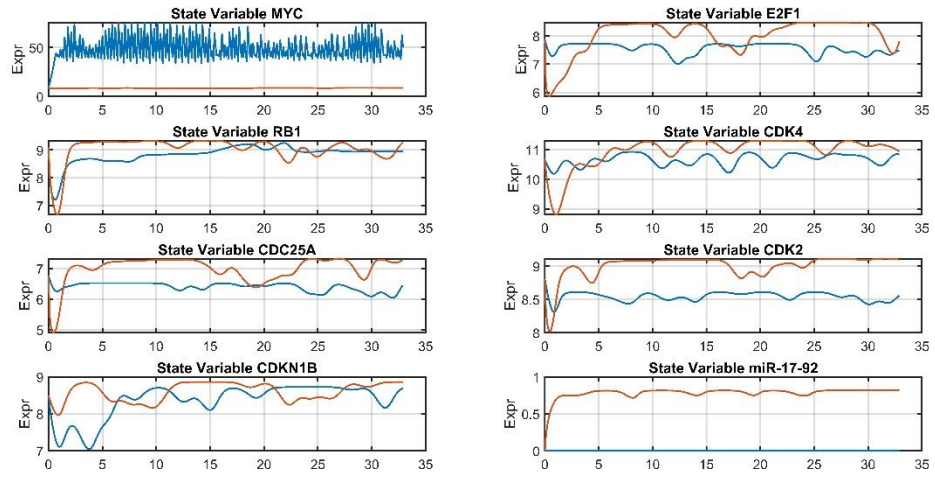


Figure 14 System response to MYC Synthesis Rate $\kappa_1=50$

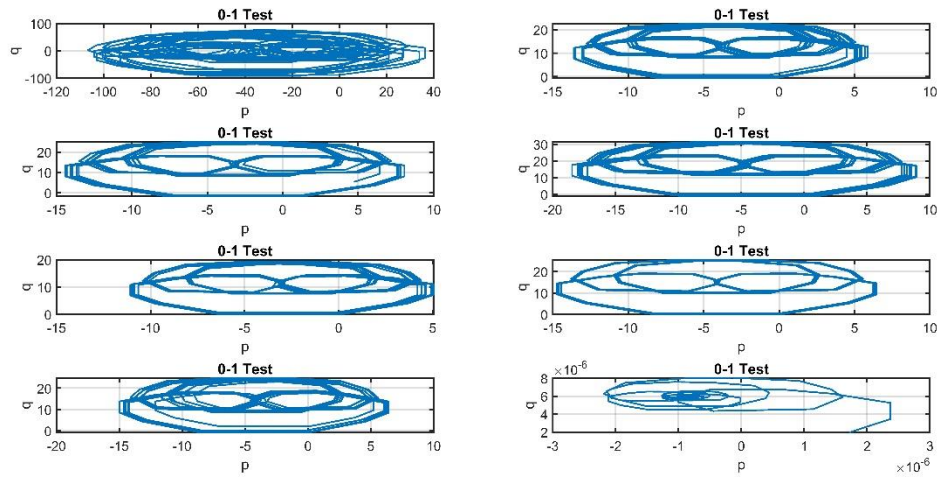


Figure 15 P-Q plot for MYC Synthesis Rate $\kappa_1=50$

B) Hela Cell Cycle

B.1 Numerical Solution

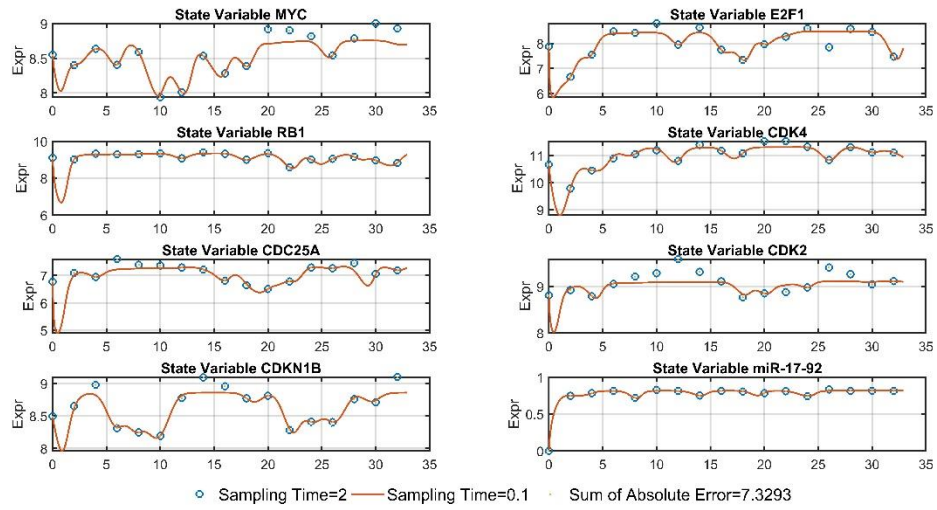


Figure 16 Modeled gene expression signals with real data points. Actual data points are marked with a circle

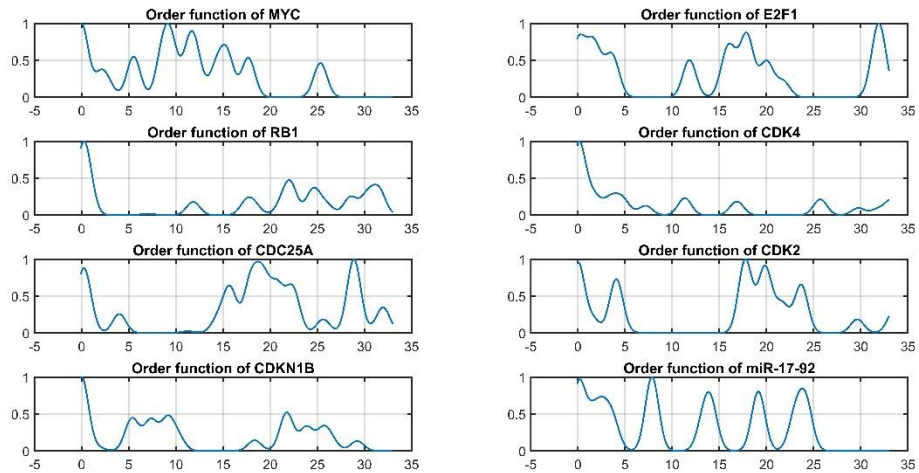


Figure 17 Variable order function

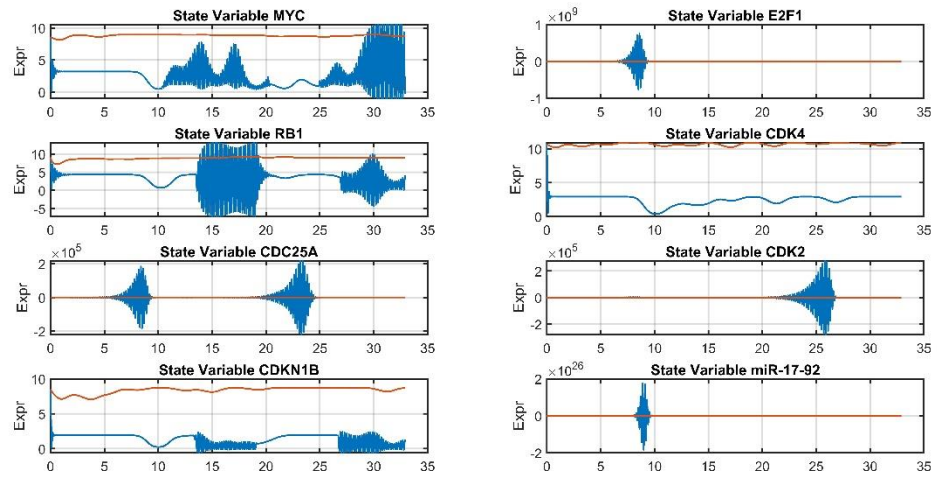


Figure 20 System response to Delay=10

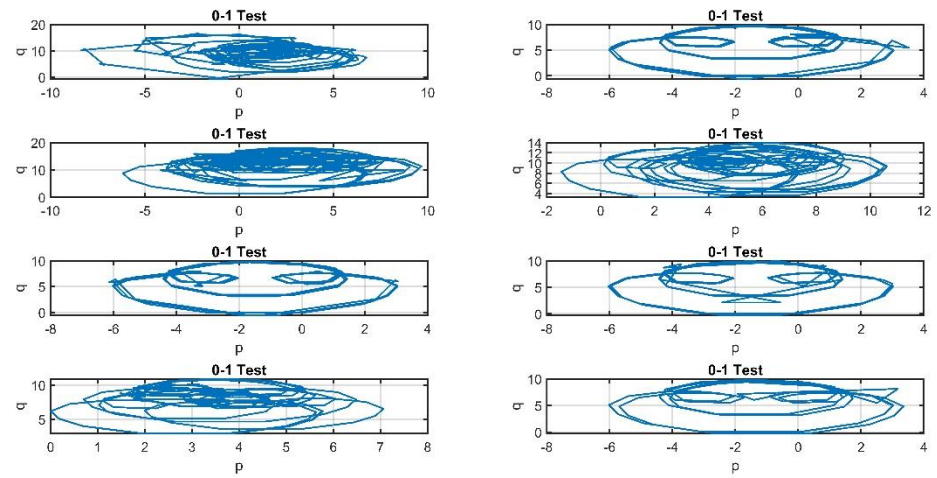


Figure 21 P-Q plot for Delay = 10

Variable order parameter effects

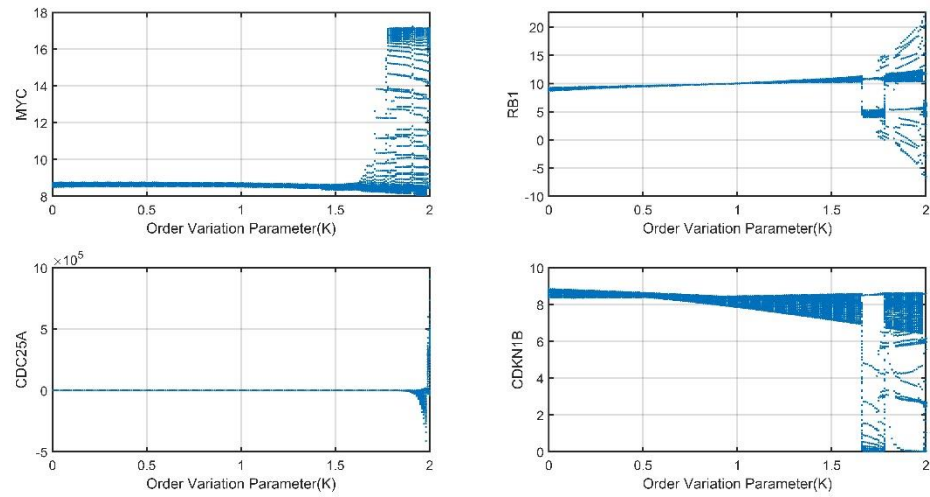


Figure 22 Bifurcation diagram for changing variable order parameter

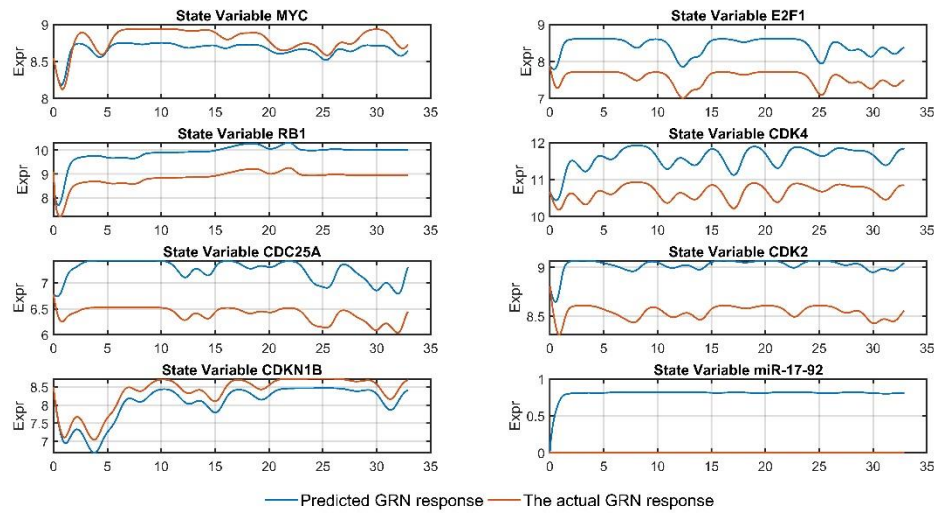


Figure 23 System response to $K=1$

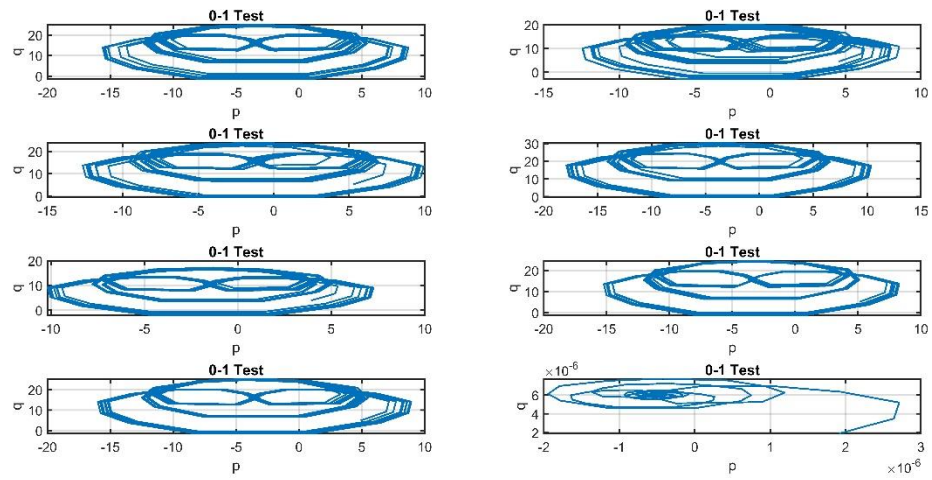


Figure 24 P-Q plot for K=1

MiR-17-92 Degradation parameter γ_8 effects

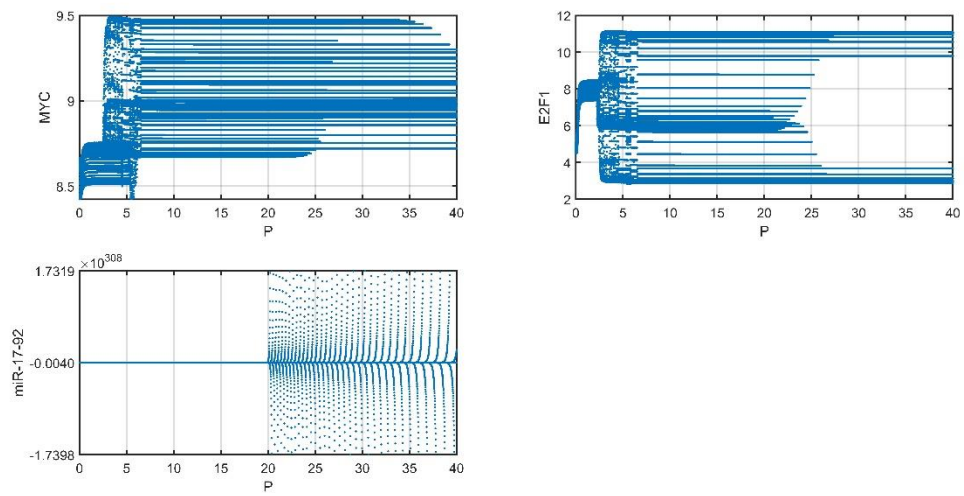


Figure 25 Bifurcation diagram for changing miR-17-92 Degradation parameter γ_8

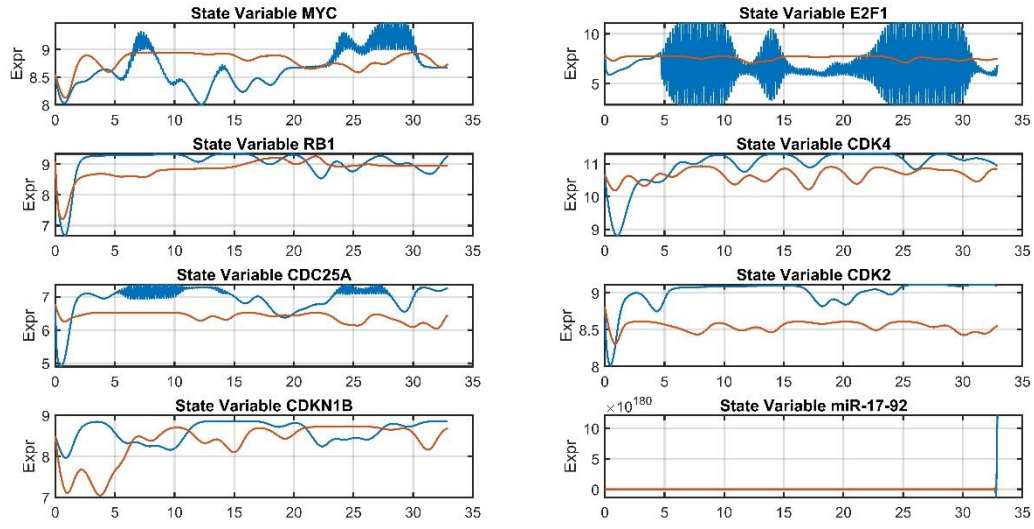


Figure 26 System response to miR-17-92 Degradation parameter =10

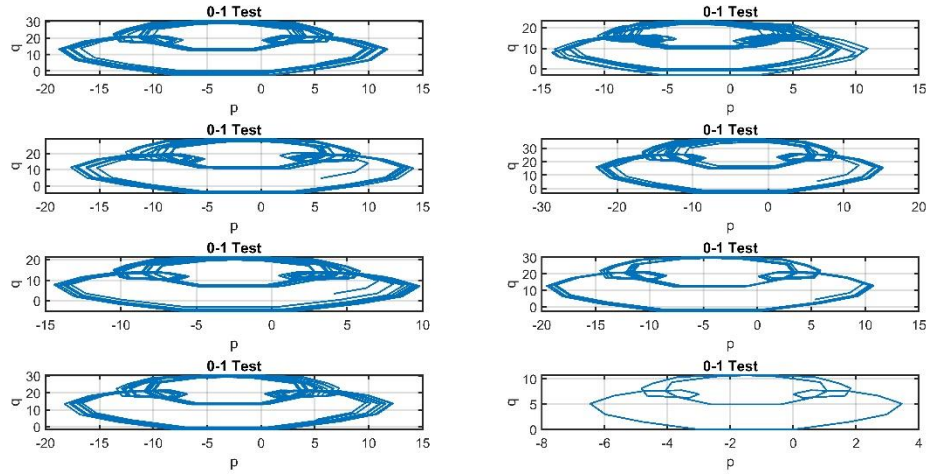


Figure 27 P-Q plot for MiR-17-92 Degradation parameter =10

Effects of MYC Synthesis Rate κ_1

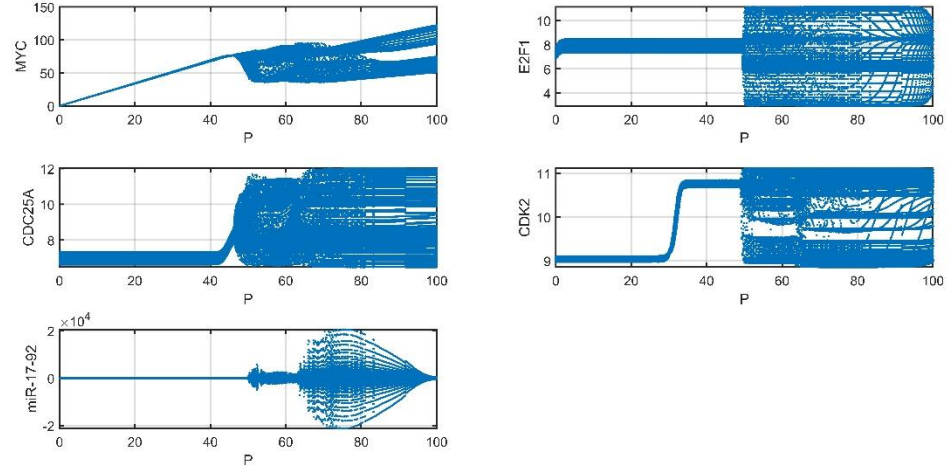


Figure 28 Bifurcation diagram for changing MYC Synthesis Rate κ_1

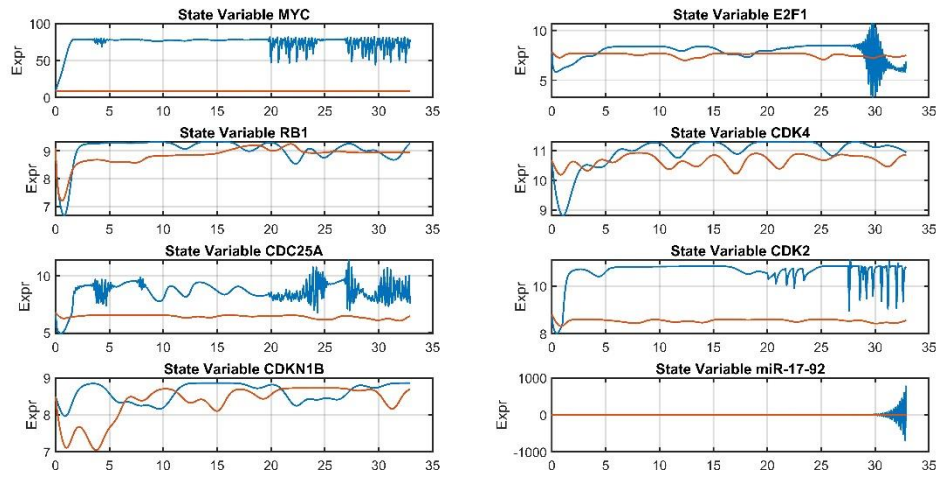


Figure 29 System response to MYC Synthesis Rate $\kappa_1 = 50$

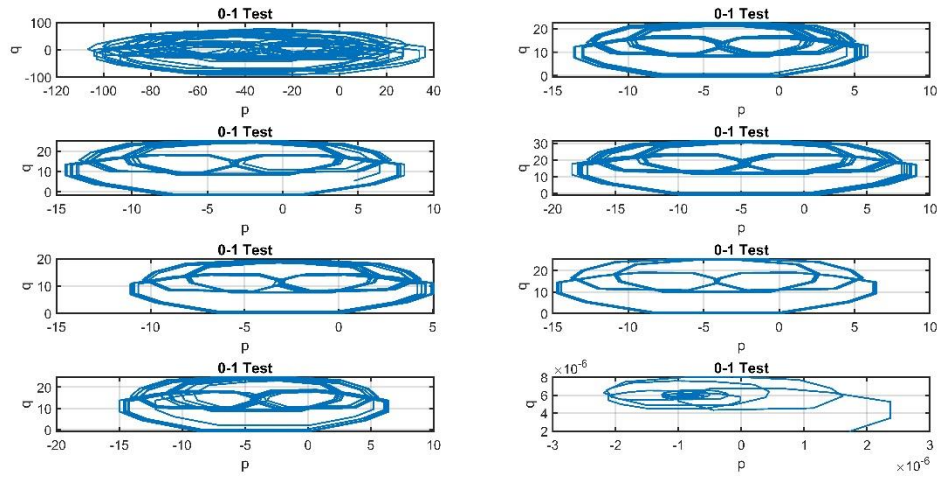


Figure 30 P-Q plot for MYC Synthesis Rate $\kappa_1=50$