

**TABLE S1**  
**Parameters for simulation B**

	<i>B-1</i>	<i>B-2</i>
Nonzero comp. of	$(w_{20}, w_{31}, w_{39}, w_{78}, w_{90}, w_{110})$	$(w_{19}, w_{20}, w_{45}, w_{46}, w_{118}, w_{119})$
the direction vector	$= (0.343, 0.343, 0.514, 0.514, -0.343, -0.343)$	$= (0.343, 0.343, 0.514, 0.514, -0.343, -0.343)$
Control Size	transcripts 1-5: (3,3,2,2,5)	
	$Y_i = \gamma_i Y_3 + \epsilon_i, i = 6 \dots 30$	
	$Y_i = \gamma_i Y_5 + \epsilon_i, i = 31 \dots 50$	
	$\gamma_i \sim \mathcal{N}(0.8, 0.1), \epsilon_i \sim \mathcal{N}(0, 0.04)$	

Expression measurement of transcript  $i$  is represented by  $Y_i$ . Transcripts 1-5 are directly controlled by an architecture, and the remaining are trans-regulated by other transcripts.