# Supplementary Material to: S-system parameter estimation for noisy metabolic profiles using Newton-flow analysis

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### 1 Examples of the attractor of the Newton-flow

In the following we provide some examples to indicate that an attractor with the properties defined in the article is likely to exist. For each minimization problem associated with the following S-systems we generated 40 Newton candidates, which are supposed to lie in close vicinity of the attractor curve. The corresponding curves were fitted and R<sup>2</sup>-values were computed. In each figure the 2-dimensional projections of the Newton candidates are marked with blue dots, the projection of the global optimum is denoted by a red star, and the attractor curve fitted to the Newton candidates is represented by a dashed green line. All R<sup>2</sup>-values were above 0.9.

**Example 1.** We investigated a 2-dimensional S-system example with four different parameter settings, each of which produced different system behaviors.

$$\dot{x}_{1} = 3x_{2}^{-2} - x_{1}^{0.5}x_{2}$$
(1)  
$$\dot{x}_{2} = x_{1}^{0.5}x_{2} - x_{2}^{0.5}$$
  
$$x_{1}(0) = 3$$
  
$$x_{2}(0) = 1$$

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$$\dot{x}_{1} = 1.5x_{2}^{-2} - x_{1}^{0.5}x_{2} \qquad (2)$$

$$\dot{x}_{2} = x_{1}^{0.5}x_{2} - x_{2}^{0.5}$$

$$x_{1}(0) = 1.5$$

$$x_{2}(0) = 1.5$$

$$\dot{x}_{1} = .75x_{2}^{-2} - x_{1}^{0.5}x_{2} \qquad (3)$$

$$\dot{x}_{2} = x_{1}^{0.5}x_{2} - x_{2}^{0.5}$$

$$x_{1}(0) = 0.75$$

$$x_{2}(0) = 1$$

$$\dot{x}_{1} = .75x_{2}^{-2} - x_{1}^{0.5}x_{2} \qquad (4)$$

$$\dot{x}_{2} = x_{1}^{0.5}x_{2} - x_{2}^{0.5}$$

$$x_{1}(0) = 0.75$$

$$x_{1}(0) = 0.75$$

$$x_{1}(0) = 0.75$$

$$x_{2}(0) = 1.5$$

The concentration curves are shown in Figure 1. The reconstructed attractors are illustrated in Figure 2. Note that the four attractors which have not been shown in the figure are extremely similar to the ones in the third column, and we thus omitted them.

**Example 2.** Figure 3 shows all reconstructed attractor curves for the 4-dimensional example we presented in the paper.

$$\dot{x}_{1} = 12x_{3}^{-0.8} - 10x_{1}^{0.5}$$

$$\dot{x}_{2} = 8x_{1}^{0.5} - 3x_{2}^{0.75}$$

$$\dot{x}_{3} = 3x_{2}^{0.75} - 5x_{3}^{0.5}x_{4}^{0.2}$$

$$\dot{x}_{4} = 2x_{1}^{0.5} - 6x_{4}^{0.8}$$
(5)

**Example 3.** In Figure 4 we present the 2-dimensional projections of three attractors (in  $\mathbb{R}^6$ ) corresponding to Eq. (11), (24), and (27) in the 30-dimensional example presented in the paper. The parameter setup was as follows: In Eq. (1) we set n=30, and take non-zero model parameters  $\alpha_i = \beta_i = 1$ ,  $g_{1,14} = -0.1$ ,  $g_{5,1} = 1.0$ ,  $g_{6,1} = 1.0$ ,  $g_{7,2} = 0.5$ ,  $g_{7,3} = 0.4$ ,  $g_{8,4} = 0.2$ ,  $g_{8,17} = -0.2$ ,  $g_{9,5} = 1.0$ ,  $g_{9,6} = -0.1$ ,  $g_{10,7} = 0.3$ ,

 $g_{11,4} = 0.4, g_{11,7} = -0.2, g_{11,22} = 0.4, g_{12,23} = 0.1, g_{13,8} = 0.6, g_{14,9} = 1.0, g_{15,10} = 0.2, g_{16,11} = 0.5, g_{16,12} = -0.2, g_{17,13} = 0.5, g_{19,14} = 0.1, g_{20,15} = 0.7, g_{20,26} = 0.3, g_{21,16} = 0.6, g_{22,16} = 0.5, g_{23,17} = 0.2, g_{24,15} = -0.2, g_{24,18} = -0.1, g_{24,19} = 0.3, g_{25,20} = 0.4, g_{26,21} = -0.2, g_{26,28} = 0.1, g_{27,24} = 0.6, g_{27,25} = 0.3, g_{27,30} = -0.2, g_{28,25} = 0.5, g_{29,26} = 0.4, \text{ and } g_{30,27} = 0.6, \text{ while } h_{i,j} \text{ was defined to be } -1 \text{ if } i = j, \text{ and } 0 \text{ otherwise. Parameter bounds were also taken as suggested in [1]: } \alpha_i, \beta_i \text{ were assumed to be in [0, 3], and } g_{i,j}, h_{i,j} \text{ were restricted to lie in [-3, 3].}$ 

**Example 4.** To investigate a less sparse example, a 7-dimensional example was constructed where the first equation includes 9 non-zero parameters. The corresponding Newton-flow has an attractor in  $\mathbb{R}^9$ . The projections of this attractor are depicted in Figure 5. The first equation was defined by the following equation.

$$\dot{x}_1 = 5x_1^{0.6}x_2^{0.75}x_5^{0.3}x_7^{-0.4} - 7x_3^{0.9}x_4^{0.8}x_6^{0.5} \tag{6}$$

From these examples we can see that the attractor is less stable in cases where  $g_{ij}h_{ij} \neq 0$  (see Example 1). Also, we observed that the more non-zero parameters occur in the equations the harder it is to identify the attractor (see Example 4). Finally, when we have parameters of smaller magnitude (relative to other parameters of the S-system) the corresponding co-ordinate of the attractor tend to become more difficult to estimate (Example 3 and 4).

#### 2 Theoretical noise

As we stated in the discussion section of our paper the error of optimal parameter is proportional to the amount of relative noise in the data. This is a direct consequence of the following theorem:

**Theorem 1.** Let  $\sigma$  denote the relative noise of the measurement values, and

 $D = diag(x_1^2(t_1), x_1^2(t_2), \dots, x_n^2(t_N), 2\dot{x}_i^2(t_1), 2\dot{x}_i^2(t_2), \dots, 2\dot{x}_i^2(t_N)), S = \left(\sum_{j=1}^N \frac{\partial}{\partial \mathbf{p}_i} f_j \frac{\partial}{\partial \mathbf{p}_i} f_j^\top\right)^{-1} \left(\sum_{j=1}^N \frac{\partial}{\partial \mathbf{p}_i} f_j \frac{\partial}{\partial \mathbf{X}} f_j^\top\right)$ Then  $cov(\Delta \mathbf{p}_i) \approx \sigma^2 S \cdot D \cdot S^\top$ 

*Proof.* By defining  $\mathbf{x} = (x_{11}, x_{12}, \dots, x_{nN})^{\top}$ ,  $\mathbf{dx}_i = (dx_{i1}, x_{i2}, \dots, x_{iN})^{\top}$ ,  $\mathbf{X} = (\mathbf{x}^{\top}, \mathbf{dx}_i^{\top})^{\top}$  and  $\mathbf{X}_0 = (x_1(t_1), x_1(t_2), \dots, x_n(t_N), \dot{x}_i(t_1), \dot{x}_i(t_2), \dots, \dot{x}_i(t_N))^{\top}$  we obtain

$$f(\mathbf{p}_i) = \sum_{j=1}^N \left( dx_i(j) - \alpha_i \prod_{k=1}^n x_k(j)^{g_{i,k}} + \beta_i \prod_{k=1}^n x_k(j)^{h_{i,k}} \right)^2 = \sum_{j=1}^N f_j^2(\mathbf{x}, \mathbf{dx}_i, \mathbf{p}_i) = \sum_{j=1}^N f_j^2(\mathbf{X}, \mathbf{p}_i)$$

Let  $\mathbf{p}_i^*$  denote the true underlying parameter vector,  $\Delta \mathbf{X} = \mathbf{X} - \mathbf{X}_0$  and  $\Delta \mathbf{p}_i = \mathbf{p}_i - \mathbf{p}_i^*$ . Since  $f_j(\mathbf{X}_0, \mathbf{p}_i^*) = 0$  for all i, j the first order Taylor approximation yields

$$\begin{split} f(\mathbf{p}_{i}) &= \sum_{j=1}^{N} f_{j}^{2}(\mathbf{x}, \mathbf{d}\mathbf{x}_{i}, \mathbf{p}_{i}) \approx \sum_{j=1}^{N} \left( \frac{\partial}{\partial \mathbf{X}} f_{j}(\mathbf{X}_{0}, \mathbf{p}_{i}^{*})^{\top} \Delta \mathbf{X} + \frac{\partial}{\partial \mathbf{p}_{i}} f_{j}(\mathbf{X}_{0}, \mathbf{p}_{i}^{*})^{\top} \Delta \mathbf{p}_{i} \right)^{2} = \\ &= \Delta \mathbf{X}^{\top} \left( \sum_{j=1}^{N} \frac{\partial}{\partial \mathbf{X}} f_{j}(\mathbf{X}_{0}, \mathbf{p}_{i}^{*}) \frac{\partial}{\partial \mathbf{X}} f_{j}(\mathbf{X}_{0}, \mathbf{p}_{i}^{*})^{\top} \right) \Delta \mathbf{X} \\ &+ 2\Delta \mathbf{p}_{i}^{*\top} \left( \sum_{j=1}^{N} \frac{\partial}{\partial \mathbf{p}_{i}} f_{j}(\mathbf{X}_{0}, \mathbf{p}_{i}^{*}) \frac{\partial}{\partial \mathbf{X}} f_{j}(\mathbf{X}_{0}, \mathbf{p}_{i}^{*})^{\top} \right) \Delta \mathbf{X} \\ &+ \Delta \mathbf{p}_{i}^{*\top} \left( \sum_{j=1}^{N} \frac{\partial}{\partial \mathbf{p}_{i}} f_{j}(\mathbf{X}_{0}, \mathbf{p}_{i}^{*}) \frac{\partial}{\partial \mathbf{p}_{i}} f_{j}(\mathbf{X}_{0}, \mathbf{p}_{i}^{*})^{\top} \right) \Delta \mathbf{p}_{i} \end{split}$$

Thus the minimization of  $f(\mathbf{p}_i)$  is locally equivalent to

$$\min_{\Delta \mathbf{p}_{i}} 2\Delta \mathbf{p}_{i}^{*\top} \left( \sum_{j=1}^{N} \frac{\partial}{\partial \mathbf{p}_{i}} f_{j} \frac{\partial}{\partial \mathbf{X}} f_{j}^{\top} \right) \Delta \mathbf{X} + \Delta \mathbf{p}_{i}^{*\top} \left( \sum_{j=1}^{N} \frac{\partial}{\partial \mathbf{p}_{i}} f_{j} \frac{\partial}{\partial \mathbf{p}_{i}} f_{j}^{\top} \right) \Delta \mathbf{p}_{i}$$

which yields the solution

$$\Delta \mathbf{p}_i \approx -\left(\sum_{j=1}^N \frac{\partial}{\partial \mathbf{p}_i} f_j \frac{\partial}{\partial \mathbf{p}_i} f_j^\top\right)^{-1} \left(\sum_{j=1}^N \frac{\partial}{\partial \mathbf{p}_i} f_j \frac{\partial}{\partial \mathbf{X}} f_j^\top\right) \Delta \mathbf{X}$$

Using the notations defined in the theorem the covariance matrix of the error of the parameter estimation is

$$\operatorname{cov}(\Delta \mathbf{p}_i) = \operatorname{E}[\Delta \mathbf{p}_i \Delta \mathbf{p}_i^{\top}] \approx S \cdot \operatorname{cov}(\Delta \mathbf{X}) \cdot S^{\top} = \sigma^2 S \cdot D \cdot S^{\top}$$
(7)

as required.

## 3 Full results for the 30-dimensional example

In the Table below we present the complete results for the 30-dimensional example in the paper.

	2% NOISE						5% NOISE					
i	$\alpha_i$		$g_{i,i}$		$\beta_i$	$h_{i,i}$	$\alpha_i$		$g_{i,i}$		$\beta_i$	hii
1	0.0077	0.0174	-	_	0.0094	0.0059	0.0455	0.0791	-	0	0.0658	0.0414
2	0.0091	_	_	_	0.0115	0.0075	0.0404	_	0	_	0.06	0.0386
3	0.0109	_	_	_	0.014	0.0089	0.0657	_	ő	_	0.0872	0.0511
4	0.0045				0.0064	0.0000	0.0001		0		0.0648	0.0284
-4 E	0.10040	0.225	_	_	0.1188	0.0042	0.0441	0.2500	0	-	0.0048	0.0384
5	0.1331	0.235	-	_	0.1188	0.0004	0.1755	0.2399	_	0	0.1557	0.0395
6	0.1335	0.2403	-	-	0.1126	0.0079	0.0573	0.0354	-	0	0.0611	0.0390
7	0.0059	0.0066	0.005	-	0.0085	0.0053	0.2931	0.5807	1.019	-	0.265	0.0465
8	0.1338	0.1503	0.1372	-	0.0997	0.0094	0.1815	1.2076	0.2895	-	0.1606	0.0516
9	0.009	0.0049	0.0135	-	0.0103	0.0068	0.1669	0.1855	0.0152	-	0.1552	0.2676
10	0.0085	0.0078	-	-	0.0118	0.0082	0.1656	0.8379	-	0	0.1385	0.0386
11	0.0148	0.0086	0.0084	0.012	0.0155	0.0106	0.0302	0.017	0.0169	0.0256	0.0491	0.0344
12	0.1277	0.076	-	-	0.102	0.0053	0.0488	0.0737	-	0	0.0638	0.0387
13	0.0085	0.0073	-	-	0.0084	0.0061	0.0553	0.0505	-	0	0.0562	0.0355
14	0.0089	0.0054	-	-	0.0095	0.0057	0.0798	0.0457	-	0	0.0814	0.0474
15	0.0049	0.0146	_	-	0.0054	0.0033	0.0591	0.0639	_	0	0.0791	0.0495
16	0.0112	0.0102	0.0151	_	0.0135	0.0083	0.0528	0.0462	0.0417	_	0.0674	0.0420
17	0.0097	0.0087	_	_	0.0139	0.0091	0.1644	0.633	_	0	0.1437	0.0411
18	0.0131	_	_	_	0.0169	0.0108	0.0434	_	0	_	0.0612	0.0384
19	0.0115	0.0346	_	_	0.014	0.0093	0.0432	0.0804	_	0	0.0614	0.0356
20	0.0097	0.0061	0.0082	_	0.014	0.0087	0.0608	0.0427	0.029	_	0.0724	0.0447
21	0.1372	0.4424	0.0002	_	0.1051	0.0113	0.0558	0.0438	0.020	0	0.0674	0.0414
22	0.0105	0.0094	_	_	0.0127	0.0081	0.067	0.0522	_	ő	0.0814	0.0485
22	0.1222	1 9459			0.0075	0.0001	0.1727	0.2687		0	0.1427	0.0444
23	0.1333	0.0068	0.0167	0.0087	0.0973	0.009	0.1737	0.3037	0.066	0.0502	0.1437	0.0444
24	0.0082	0.0003	0.0107	0.0087	0.0039	0.0002	0.0530	0.0278	0.000	0.0303	0.0704	0.0405
20	0.0093	0.0077	-	_	0.0112	0.0071	0.052	0.0331	-	0	0.0625	0.0395
26	0.0113	0.011	0.0223	-	0.014	0.0085	0.0449	0.0234	0.0948	-	0.0567	0.0353
27	0.2531	0.7511	0.466	0.0588	0.237	0.279	0.0414	0.0323	0.0253	0.0219	0.0519	0.0350
28	0.0118	0.0109	-	-	0.0128	0.0073	0.0397	0.0343	-	0	0.0494	0.0318
29	0.0131	0.011	-	-	0.0149	0.0089	0.1675	0.8255	-	0	0.1295	0.0375
30	0.1367	0.4356	_	_	0.0959	0.0106	0.0733	0.0514	_	0	0.0883	0.0538
			1007 3	NOTOR					2007 1	LOIOE		
		1	10% I	NOISE		•			20% 1	NOISE	2	
i	$\alpha_i$		$10\%$ I $g_{i,j}$	NOISE	$\beta_i$	$h_{i,i}$	$\alpha_i$		$\frac{20\%}{g_{i,j}}$ 1	NOISE	$\beta_i$	$h_{i,i}$
i 1	$\frac{\alpha_i}{0.1704}$	0.0845	10% 1 $g_{i,j}$	NOISE -	$\beta_i$ 0.2447	$h_{i,i}$ 0.1379	$\frac{\alpha_i}{0.4872}$	0.3167	20% 1 g <sub>i,j</sub> _	NOISE -	$\beta_i$ 0.7432	$h_{i,i}$ 0.3469
i 1 2	$\alpha_i$ 0.1704 0.1636	0.0845	$\frac{10\% 1}{g_{i,j}}$	NOISE - -	$\beta_i$ 0.2447 0.2393	$h_{i,i}$ 0.1379 0.1361	$\alpha_i$ 0.4872 0.4755	0.3167	20% 1 	HOISE	$egin{array}{c} \beta_i \\ 0.7432 \\ 0.7173 \end{array}$	$h_{i,i}$ 0.3469 0.3381
i 1 2 3	$\alpha_i$ 0.1704 0.1636 0.1904	0.0845 _ _	10% 1 g <sub>i,j</sub> _ _		$egin{array}{c} \beta_i \\ 0.2447 \\ 0.2393 \\ 0.2673 \end{array}$	$\begin{array}{r} h_{i,i} \\ 0.1379 \\ 0.1361 \\ 0.1465 \end{array}$	$\begin{array}{c} \alpha_i \\ 0.4872 \\ 0.4755 \\ 0.4706 \end{array}$	0.3167	20% f g_{i,j} _ _ _		$egin{array}{c} \beta_i \\ 0.7432 \\ 0.7173 \\ 0.7180 \end{array}$	$\begin{array}{c} h_{i,i} \\ 0.3469 \\ 0.3381 \\ 0.3417 \end{array}$
i 1 2 3 4	$lpha_i$ 0.1704 0.1636 0.1904 0.1393	0.0845 _ _ _	10% 1 $g_{i,j}$ - - -	NOISE - - - -	$egin{array}{c} \beta_i \\ 0.2447 \\ 0.2393 \\ 0.2673 \\ 0.2144 \end{array}$	$\begin{array}{r} h_{i,i} \\ 0.1379 \\ 0.1361 \\ 0.1465 \\ 0.1249 \end{array}$	$\begin{array}{c} \alpha_i \\ 0.4872 \\ 0.4755 \\ 0.4706 \\ 0.3966 \end{array}$	0.3167	20% 1 		$egin{array}{c} \beta_i \\ 0.7432 \\ 0.7173 \\ 0.7180 \\ 0.6231 \end{array}$	$\begin{array}{c} h_{i,i} \\ 0.3469 \\ 0.3381 \\ 0.3417 \\ 0.3100 \end{array}$
i 1 2 3 4 5	$lpha_i$ 0.1704 0.1636 0.1904 0.1393 0.2453	0.0845 - - 0.1349	10% 1 9i,j - - - -	NOISE - - - - -	$\begin{array}{c} \beta_i \\ 0.2447 \\ 0.2393 \\ 0.2673 \\ 0.2144 \\ 0.2532 \end{array}$	$\begin{array}{c} h_{i,i} \\ 0.1379 \\ 0.1361 \\ 0.1465 \\ 0.1249 \\ 0.1404 \end{array}$	$\begin{array}{c} \alpha_i \\ 0.4872 \\ 0.4755 \\ 0.4706 \\ 0.3966 \\ 0.6607 \end{array}$	0.3167	20% 1 9i,j - - - -		$egin{array}{c} \beta_i \\ 0.7432 \\ 0.7173 \\ 0.7180 \\ 0.6231 \\ 0.6479 \end{array}$	$\begin{array}{c} h_{i,i} \\ 0.3469 \\ 0.3381 \\ 0.3417 \\ 0.3100 \\ 0.3292 \end{array}$
i 1 2 3 4 5 6	$\begin{array}{r} \alpha_i \\ 0.1704 \\ 0.1636 \\ 0.1904 \\ 0.1393 \\ 0.2453 \\ 0.2582 \end{array}$	0.0845 - - 0.1349 0.1363	10% I g <sub>i,j</sub> _ _ _ _ _	NOISE      	$\begin{array}{r} \beta_i \\ 0.2447 \\ 0.2393 \\ 0.2673 \\ 0.2144 \\ 0.2532 \\ 0.2753 \end{array}$	$\begin{array}{c} h_{i,i} \\ 0.1379 \\ 0.1361 \\ 0.1465 \\ 0.1249 \\ 0.1404 \\ 0.1521 \end{array}$	$\begin{array}{c} \alpha_i \\ 0.4872 \\ 0.4755 \\ 0.4706 \\ 0.3966 \\ 0.6607 \\ 0.7509 \end{array}$	$\begin{array}{c} 0.3167 \\ - \\ - \\ 0.3350 \\ 0.3441 \end{array}$	<u>20%</u> I <u>gi,j</u>   		$egin{array}{c} \beta_i \\ 0.7432 \\ 0.7173 \\ 0.7180 \\ 0.6231 \\ 0.6479 \\ 0.7515 \end{array}$	$\begin{array}{c} h_{i,i} \\ 0.3469 \\ 0.3381 \\ 0.3417 \\ 0.3100 \\ 0.3292 \\ 0.3463 \end{array}$
i 1 2 3 4 5 6 7	$\begin{array}{r} \alpha_i \\ 0.1704 \\ 0.1636 \\ 0.1904 \\ 0.1393 \\ 0.2453 \\ 0.2582 \\ 0.1815 \end{array}$	0.0845 - - 0.1349 0.1363 0.0994	$   \begin{array}{r} 10\% 1 \\     g_{i,j} \\     - \\     - \\     - \\     0.1146   \end{array} $	NOISE        	$\begin{array}{r} \beta_i \\ 0.2447 \\ 0.2393 \\ 0.2673 \\ 0.2144 \\ 0.2532 \\ 0.2753 \\ 0.2379 \end{array}$	$\begin{array}{c} h_{i,i} \\ 0.1379 \\ 0.1361 \\ 0.1465 \\ 0.1249 \\ 0.1404 \\ 0.1521 \\ 0.1375 \end{array}$	$\begin{array}{c} \alpha_i \\ 0.4872 \\ 0.4755 \\ 0.4706 \\ 0.3966 \\ 0.6607 \\ 0.7509 \\ 0.5943 \end{array}$	$\begin{array}{c} 0.3167 \\ - \\ - \\ 0.3350 \\ 0.3441 \\ 0.3196 \end{array}$	20% 1 $g_{i,j}$ - - - - 0.2871		$egin{array}{c} \beta_i \\ 0.7432 \\ 0.7173 \\ 0.7180 \\ 0.6231 \\ 0.6479 \\ 0.7515 \\ 0.7148 \end{array}$	$\begin{array}{r} h_{i,i} \\ 0.3469 \\ 0.3381 \\ 0.3417 \\ 0.3100 \\ 0.3292 \\ 0.3463 \\ 0.3402 \end{array}$
i 1 2 3 4 5 6 7 8	$\begin{array}{r} \alpha_i \\ 0.1704 \\ 0.1636 \\ 0.1904 \\ 0.1393 \\ 0.2453 \\ 0.2582 \\ 0.1815 \\ 0.1963 \end{array}$	$\begin{array}{c} 0.0845 \\ - \\ - \\ 0.1349 \\ 0.1363 \\ 0.0994 \\ 0.1527 \end{array}$	$ \begin{array}{r} 10\% 1 \\ g_{i,j} \\ - \\ - \\ - \\ - \\ - \\ - \\ 0.1146 \\ 0.0969 \end{array} $	NOISE 	$\begin{array}{c} \beta_i \\ 0.2447 \\ 0.2393 \\ 0.2673 \\ 0.2144 \\ 0.2532 \\ 0.2753 \\ 0.2379 \\ 0.2656 \end{array}$	$\begin{array}{c} h_{i,i} \\ 0.1379 \\ 0.1361 \\ 0.1465 \\ 0.1249 \\ 0.1404 \\ 0.1521 \\ 0.1375 \\ 0.1454 \end{array}$	$\begin{array}{c} \alpha_i \\ 0.4872 \\ 0.4755 \\ 0.4706 \\ 0.3966 \\ 0.6607 \\ 0.7509 \\ 0.5943 \\ 0.4706 \end{array}$	$\begin{array}{c} 0.3167 \\ - \\ - \\ 0.3350 \\ 0.3441 \\ 0.3196 \\ 0.3749 \end{array}$	$\begin{array}{c c} 20\% 1\\ \hline g_{i,j}\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ 0.2871\\ 0.1906 \end{array}$		$\begin{array}{c} \beta_i \\ 0.7432 \\ 0.7173 \\ 0.7180 \\ 0.6231 \\ 0.6479 \\ 0.7515 \\ 0.7148 \\ 0.6570 \end{array}$	$\begin{array}{c} h_{i,i} \\ 0.3469 \\ 0.3381 \\ 0.3417 \\ 0.3100 \\ 0.3292 \\ 0.3463 \\ 0.3402 \\ 0.3199 \end{array}$
i 1 2 3 4 5 6 7 8 9	$\begin{array}{r} \alpha_i \\ 0.1704 \\ 0.1636 \\ 0.1904 \\ 0.1393 \\ 0.2453 \\ 0.2582 \\ 0.1815 \\ 0.1963 \\ 0.2325 \end{array}$	$\begin{array}{c} 0.0845 \\ - \\ - \\ 0.1349 \\ 0.1363 \\ 0.0994 \\ 0.1527 \\ 0.1314 \end{array}$	$\begin{array}{c} 10\% 1\\ g_{i,j}\\ -\\ -\\ -\\ -\\ 0.1146\\ 0.0969\\ 0.0705 \end{array}$	NOISE 	$\begin{array}{r} \beta_i \\ \hline 0.2447 \\ 0.2393 \\ 0.2673 \\ 0.2144 \\ 0.2532 \\ 0.2753 \\ 0.2379 \\ 0.2656 \\ 0.2315 \end{array}$	$\begin{array}{c} h_{i,i} \\ 0.1379 \\ 0.1361 \\ 0.1465 \\ 0.1249 \\ 0.1404 \\ 0.1521 \\ 0.1375 \\ 0.1454 \\ 0.1322 \end{array}$	$\begin{array}{c} \alpha_i \\ 0.4872 \\ 0.4755 \\ 0.4706 \\ 0.3966 \\ 0.6607 \\ 0.7509 \\ 0.5943 \\ 0.4706 \\ 0.6315 \end{array}$	$\begin{array}{c} 0.3167 \\ - \\ 0.3350 \\ 0.3441 \\ 0.3196 \\ 0.3749 \\ 0.3199 \end{array}$	$\begin{array}{c} 20\% 1\\ \hline g_{i,j}\\ -\\ -\\ -\\ -\\ 0.2871\\ 0.1906\\ 0.1282 \end{array}$		$\begin{array}{c} \beta_i \\ 0.7432 \\ 0.7173 \\ 0.7180 \\ 0.6231 \\ 0.6479 \\ 0.7515 \\ 0.7515 \\ 0.7148 \\ 0.6570 \\ 0.6394 \end{array}$	$\begin{array}{r} h_{i,i} \\ 0.3469 \\ 0.3381 \\ 0.3417 \\ 0.3100 \\ 0.3292 \\ 0.3463 \\ 0.3402 \\ 0.3199 \\ 0.3236 \end{array}$
i 1 2 3 4 5 6 7 8 9 10	$\begin{array}{c} \alpha_i \\ 0.1704 \\ 0.1636 \\ 0.1904 \\ 0.1393 \\ 0.2453 \\ 0.2582 \\ 0.1815 \\ 0.1963 \\ 0.2325 \\ 0.2203 \end{array}$	$\begin{array}{c} 0.0845 \\ - \\ - \\ 0.1349 \\ 0.1363 \\ 0.0994 \\ 0.1527 \\ 0.1314 \\ 0.2099 \end{array}$	$\begin{array}{c} 10\% 1\\ g_{i,j}\\ -\\ -\\ -\\ -\\ 0.1146\\ 0.0969\\ 0.0705\\ -\end{array}$	NOISE 	$\begin{array}{c} \beta_i \\ 0.2447 \\ 0.2393 \\ 0.2673 \\ 0.2144 \\ 0.2532 \\ 0.2753 \\ 0.2379 \\ 0.2656 \\ 0.2315 \\ 0.2735 \end{array}$	$\begin{array}{c} h_{i,i} \\ 0.1379 \\ 0.1361 \\ 0.1465 \\ 0.1249 \\ 0.1404 \\ 0.1521 \\ 0.1375 \\ 0.1454 \\ 0.1322 \\ 0.149 \end{array}$	$\begin{array}{c} \alpha_i \\ 0.4872 \\ 0.4755 \\ 0.4706 \\ 0.3966 \\ 0.6607 \\ 0.7509 \\ 0.5943 \\ 0.4706 \\ 0.6315 \\ 0.4383 \end{array}$	$\begin{array}{c} 0.3167 \\ - \\ - \\ 0.3350 \\ 0.3441 \\ 0.3196 \\ 0.3749 \\ 0.3199 \\ 0.2868 \end{array}$	$\begin{array}{c} 20\% 1\\ g_{i,j}\\ -\\ -\\ -\\ 0.2871\\ 0.1906\\ 0.1282\\ -\end{array}$		$\begin{array}{c} \beta_i \\ 0.7432 \\ 0.7173 \\ 0.7180 \\ 0.6231 \\ 0.6479 \\ 0.7515 \\ 0.7148 \\ 0.6570 \\ 0.6394 \\ 0.6512 \end{array}$	$\begin{array}{c} h_{i,i} \\ 0.3469 \\ 0.3381 \\ 0.3417 \\ 0.3100 \\ 0.3292 \\ 0.3463 \\ 0.3402 \\ 0.3199 \\ 0.3236 \\ 0.3221 \end{array}$
i 1 2 3 4 5 6 7 8 9 10 11	$\begin{array}{c} \alpha_i \\ 0.1704 \\ 0.1636 \\ 0.1904 \\ 0.1393 \\ 0.2453 \\ 0.2582 \\ 0.1815 \\ 0.1963 \\ 0.2325 \\ 0.2203 \\ 0.1551 \end{array}$	$\begin{array}{c} 0.0845 \\ - \\ - \\ 0.1349 \\ 0.1363 \\ 0.0994 \\ 0.1527 \\ 0.1314 \\ 0.2099 \\ 0.1006 \end{array}$	$\begin{array}{c} 10\% \ 1\\ g_{i,j} \\ -\\ -\\ -\\ -\\ 0.1146 \\ 0.0969 \\ 0.0705 \\ 0.0853 \end{array}$	NOISE - - - - - - - - - - 0.1012	$\begin{array}{c} \beta_i \\ 0.2447 \\ 0.2393 \\ 0.2673 \\ 0.2144 \\ 0.2532 \\ 0.2753 \\ 0.2379 \\ 0.2656 \\ 0.2315 \\ 0.2735 \\ 0.2053 \end{array}$	$\begin{array}{c} h_{i,i} \\ 0.1379 \\ 0.1361 \\ 0.1465 \\ 0.1249 \\ 0.1404 \\ 0.1521 \\ 0.1375 \\ 0.1454 \\ 0.1322 \\ 0.149 \\ 0.1213 \end{array}$	$\begin{array}{c} \alpha_i \\ 0.4872 \\ 0.4755 \\ 0.4706 \\ 0.3966 \\ 0.6607 \\ 0.7509 \\ 0.5943 \\ 0.4706 \\ 0.6315 \\ 0.4383 \\ 0.5234 \end{array}$	$\begin{array}{c} 0.3167 \\ - \\ - \\ 0.3350 \\ 0.3441 \\ 0.3196 \\ 0.3749 \\ 0.3199 \\ 0.2868 \\ 0.3017 \end{array}$	$\begin{array}{c} 20\% \text{ f} \\ g_{i,j} \\ - \\ - \\ - \\ 0.2871 \\ 0.1906 \\ 0.1282 \\ 0.1967 \end{array}$	NOISE 	$\begin{array}{c} \beta_i \\ 0.7432 \\ 0.7173 \\ 0.7180 \\ 0.6231 \\ 0.6479 \\ 0.7515 \\ 0.7148 \\ 0.6570 \\ 0.6394 \\ 0.6512 \\ 0.6829 \end{array}$	$\begin{array}{c} h_{i,i} \\ 0.3469 \\ 0.3381 \\ 0.3417 \\ 0.3100 \\ 0.3292 \\ 0.3463 \\ 0.3402 \\ 0.3199 \\ 0.3236 \\ 0.3221 \\ 0.3313 \end{array}$
$ \begin{array}{c} i \\ 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \\ 7 \\ 8 \\ 9 \\ 10 \\ 11 \\ 12 \end{array} $	$\begin{array}{c} \alpha_i \\ 0.1704 \\ 0.1636 \\ 0.1904 \\ 0.1393 \\ 0.2453 \\ 0.2582 \\ 0.1815 \\ 0.1963 \\ 0.2325 \\ 0.2203 \\ 0.1551 \\ 0.1676 \end{array}$	$\begin{array}{c} 0.0845 \\ - \\ - \\ 0.1349 \\ 0.1363 \\ 0.0994 \\ 0.1527 \\ 0.1314 \\ 0.2099 \\ 0.1006 \\ 0.1326 \end{array}$	$\begin{array}{c} 10\% 1\\ g_{i,j}\\ -\\ -\\ -\\ -\\ 0.1146\\ 0.0969\\ 0.0705\\ -\\ 0.0853\\ -\end{array}$	NOISE 	$\begin{array}{c} \beta_i \\ 0.2447 \\ 0.2393 \\ 0.2673 \\ 0.2144 \\ 0.2532 \\ 0.2753 \\ 0.2379 \\ 0.2656 \\ 0.2315 \\ 0.2735 \\ 0.2053 \\ 0.2053 \\ 0.2346 \end{array}$	$\begin{array}{c} h_{i,i} \\ 0.1379 \\ 0.1361 \\ 0.1465 \\ 0.1249 \\ 0.1404 \\ 0.1521 \\ 0.1375 \\ 0.1454 \\ 0.1322 \\ 0.149 \\ 0.1213 \\ 0.1289 \end{array}$	$\begin{array}{c} \alpha_i \\ 0.4872 \\ 0.4755 \\ 0.4706 \\ 0.3966 \\ 0.6607 \\ 0.7509 \\ 0.5943 \\ 0.4706 \\ 0.6315 \\ 0.4383 \\ 0.5234 \\ 0.4503 \end{array}$	$\begin{array}{c} 0.3167 \\ - \\ - \\ 0.3350 \\ 0.3441 \\ 0.3196 \\ 0.3749 \\ 0.3199 \\ 0.2868 \\ 0.3017 \\ 0.3933 \end{array}$	$\begin{array}{c} 20\% 1\\ g_{i,j}\\ -\\ -\\ -\\ -\\ -\\ 0.2871\\ 0.1906\\ 0.1282\\ -\\ 0.1967\\ -\end{array}$		$\begin{array}{c} \beta_i \\ 0.7432 \\ 0.7173 \\ 0.7173 \\ 0.6231 \\ 0.6231 \\ 0.6479 \\ 0.7515 \\ 0.7148 \\ 0.6570 \\ 0.6394 \\ 0.6512 \\ 0.6829 \\ 0.6785 \end{array}$	$\begin{array}{c} h_{i,i} \\ 0.3469 \\ 0.3381 \\ 0.3417 \\ 0.3100 \\ 0.3292 \\ 0.3463 \\ 0.3402 \\ 0.3199 \\ 0.3236 \\ 0.3221 \\ 0.3313 \\ 0.3314 \end{array}$
$ \begin{array}{c} i \\ 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \\ 7 \\ 8 \\ 9 \\ 10 \\ 11 \\ 12 \\ 13 \\ \end{array} $	$\begin{array}{c} \alpha_i \\ 0.1704 \\ 0.1636 \\ 0.1904 \\ 0.1393 \\ 0.2453 \\ 0.2582 \\ 0.1815 \\ 0.1963 \\ 0.2325 \\ 0.2203 \\ 0.1551 \\ 0.1676 \\ 0.2094 \end{array}$	$\begin{array}{c} 0.0845\\ -\\ -\\ 0.1349\\ 0.1363\\ 0.0994\\ 0.1527\\ 0.1314\\ 0.2099\\ 0.1006\\ 0.1326\\ 0.1535\end{array}$	$\begin{array}{c} 10\% \ \mathrm{I} \\ g_{i,j} \\ - \\ - \\ - \\ 0.1146 \\ 0.0969 \\ 0.0705 \\ - \\ 0.0853 \\ - \\ - \end{array}$	NOISE 	$\begin{array}{r} \beta_i \\ 0.2447 \\ 0.2393 \\ 0.2673 \\ 0.2144 \\ 0.2532 \\ 0.2753 \\ 0.2379 \\ 0.2656 \\ 0.2315 \\ 0.2735 \\ 0.2053 \\ 0.2053 \\ 0.2346 \\ 0.2398 \end{array}$	$\begin{array}{r} h_{i,i} \\ 0.1379 \\ 0.1361 \\ 0.1465 \\ 0.1249 \\ 0.1404 \\ 0.1521 \\ 0.1375 \\ 0.1454 \\ 0.1375 \\ 0.1454 \\ 0.1322 \\ 0.149 \\ 0.1213 \\ 0.1289 \\ 0.138 \end{array}$	$\begin{array}{c} \alpha_i \\ 0.4872 \\ 0.4755 \\ 0.4706 \\ 0.3966 \\ 0.6607 \\ 0.7509 \\ 0.5943 \\ 0.4706 \\ 0.6315 \\ 0.4383 \\ 0.5234 \\ 0.4503 \\ 0.4719 \end{array}$	$\begin{array}{c} 0.3167 \\ - \\ - \\ 0.3350 \\ 0.3441 \\ 0.3196 \\ 0.3749 \\ 0.3199 \\ 0.2868 \\ 0.3017 \\ 0.3933 \\ 0.3215 \end{array}$	$\begin{array}{c} 20\% 1\\ g_{i,j}\\ -\\ -\\ -\\ -\\ 0.2871\\ 0.1906\\ 0.1282\\ -\\ 0.1967\\ -\\ -\\ -\\ -\\ -\\ 0.1967\\ -\\ -\\ -\\ -\end{array}$	NOISE 	$\begin{array}{c} \beta_i \\ 0.7432 \\ 0.7173 \\ 0.7173 \\ 0.6231 \\ 0.6479 \\ 0.7515 \\ 0.7148 \\ 0.6570 \\ 0.6394 \\ 0.6512 \\ 0.6829 \\ 0.6785 \\ 0.6200 \end{array}$	$\begin{array}{c} h_{i,i} \\ 0.3469 \\ 0.3381 \\ 0.3417 \\ 0.3100 \\ 0.3292 \\ 0.3463 \\ 0.3402 \\ 0.3199 \\ 0.3236 \\ 0.3221 \\ 0.3313 \\ 0.3314 \\ 0.3166 \end{array}$
$ \begin{array}{c} i \\ 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \\ 7 \\ 8 \\ 9 \\ 10 \\ 11 \\ 12 \\ 13 \\ 14 \\ \end{array} $	$\begin{array}{c} \alpha_i \\ 0.1704 \\ 0.1636 \\ 0.1904 \\ 0.1393 \\ 0.2453 \\ 0.2582 \\ 0.1815 \\ 0.1963 \\ 0.2325 \\ 0.2203 \\ 0.1551 \\ 0.1676 \\ 0.2094 \\ 0.2452 \end{array}$	$\begin{array}{c} 0.0845\\ -\\ -\\ -\\ 0.1349\\ 0.1363\\ 0.0994\\ 0.1527\\ 0.1314\\ 0.2099\\ 0.1006\\ 0.1326\\ 0.1535\\ 0.1391 \end{array}$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	NOISE 	$\begin{array}{r} \beta_i \\ 0.2447 \\ 0.2393 \\ 0.2673 \\ 0.2144 \\ 0.2532 \\ 0.2753 \\ 0.2379 \\ 0.2656 \\ 0.2315 \\ 0.2735 \\ 0.2053 \\ 0.2053 \\ 0.2384 \\ 0.2384 \end{array}$	$\begin{array}{c} h_{i,i} \\ 0.1379 \\ 0.1361 \\ 0.1465 \\ 0.1249 \\ 0.1404 \\ 0.1521 \\ 0.1375 \\ 0.1454 \\ 0.1322 \\ 0.149 \\ 0.1213 \\ 0.1289 \\ 0.138 \\ 0.1331 \end{array}$	$\begin{array}{c} \alpha_i \\ 0.4872 \\ 0.4755 \\ 0.4706 \\ 0.3966 \\ 0.6607 \\ 0.7509 \\ 0.5943 \\ 0.4706 \\ 0.6315 \\ 0.4383 \\ 0.5234 \\ 0.4503 \\ 0.4719 \\ 0.6829 \end{array}$	$\begin{array}{c} 0.3167\\ -\\ -\\ 0.3350\\ 0.3441\\ 0.3196\\ 0.3749\\ 0.3199\\ 0.2868\\ 0.3017\\ 0.3933\\ 0.3215\\ 0.3347\\ \end{array}$	$\begin{array}{c} 20\% \ 1\\ g_{i,j}\\ -\\ -\\ -\\ 0.2871\\ 0.1906\\ 0.1282\\ -\\ 0.1967\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\$	NOISE 	$\begin{array}{c} \beta_i \\ 0.7432 \\ 0.7173 \\ 0.7180 \\ 0.6231 \\ 0.6479 \\ 0.7515 \\ 0.7148 \\ 0.6570 \\ 0.6394 \\ 0.6512 \\ 0.6829 \\ 0.6785 \\ 0.6200 \\ 0.6529 \end{array}$	$\begin{array}{c} h_{i,i} \\ 0.3469 \\ 0.3381 \\ 0.3417 \\ 0.3100 \\ 0.3292 \\ 0.3463 \\ 0.3402 \\ 0.3199 \\ 0.3236 \\ 0.3221 \\ 0.3313 \\ 0.3314 \\ 0.3166 \\ 0.3202 \end{array}$
$\begin{array}{c} \mathbf{i} \\ 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \\ 7 \\ 8 \\ 9 \\ 10 \\ 11 \\ 12 \\ 13 \\ 14 \\ 15 \end{array}$	$\begin{array}{c} \alpha_i \\ 0.1704 \\ 0.1636 \\ 0.1904 \\ 0.1393 \\ 0.2453 \\ 0.2582 \\ 0.1815 \\ 0.1963 \\ 0.2325 \\ 0.2203 \\ 0.1551 \\ 0.1676 \\ 0.2094 \\ 0.2452 \\ 0.1874 \end{array}$	$\begin{array}{c} 0.0845\\ -\\ -\\ -\\ -\\ 0.1349\\ 0.1363\\ 0.0994\\ 0.1527\\ 0.1314\\ 0.2099\\ 0.1006\\ 0.1326\\ 0.1535\\ 0.1391\\ 0.1549 \end{array}$	$\begin{array}{c} 10\% \ \mathrm{I} \\ g_{i,j} \\ - \\ - \\ - \\ - \\ 0.1146 \\ 0.0969 \\ 0.0705 \\ 0.0853 \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ $	NOISE 	$\begin{array}{r} \beta_i \\ 0.2447 \\ 0.2393 \\ 0.2673 \\ 0.2144 \\ 0.2532 \\ 0.2753 \\ 0.2379 \\ 0.2656 \\ 0.2315 \\ 0.2735 \\ 0.2053 \\ 0.2346 \\ 0.2398 \\ 0.2384 \\ 0.2569 \end{array}$	$\begin{array}{r} h_{i,i} \\ 0.1379 \\ 0.1361 \\ 0.1465 \\ 0.1249 \\ 0.1404 \\ 0.1521 \\ 0.1375 \\ 0.1454 \\ 0.1322 \\ 0.149 \\ 0.1213 \\ 0.1289 \\ 0.138 \\ 0.1381 \\ 0.1462 \end{array}$	$\begin{array}{c} \alpha_i \\ 0.4872 \\ 0.4755 \\ 0.4706 \\ 0.3966 \\ 0.6607 \\ 0.7509 \\ 0.5943 \\ 0.4706 \\ 0.6315 \\ 0.4383 \\ 0.5234 \\ 0.4503 \\ 0.4719 \\ 0.6829 \\ 0.5458 \end{array}$	$\begin{array}{c} 0.3167 \\ - \\ - \\ 0.3350 \\ 0.3441 \\ 0.3196 \\ 0.3749 \\ 0.2868 \\ 0.3017 \\ 0.3933 \\ 0.3215 \\ 0.3347 \\ 0.3639 \end{array}$	$\begin{array}{c} 20\% \ 1\\ g_{i,j}\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\$	NOISE 	$\begin{array}{c} \beta_i \\ 0.7432 \\ 0.7173 \\ 0.7180 \\ 0.6231 \\ 0.6479 \\ 0.7515 \\ 0.7148 \\ 0.6570 \\ 0.6394 \\ 0.6512 \\ 0.6829 \\ 0.6785 \\ 0.6200 \\ 0.6529 \\ 0.7879 \end{array}$	$\begin{array}{c} h_{i,i} \\ 0.3469 \\ 0.3381 \\ 0.3417 \\ 0.3100 \\ 0.3292 \\ 0.3463 \\ 0.3402 \\ 0.3199 \\ 0.3236 \\ 0.3221 \\ 0.3313 \\ 0.3314 \\ 0.3166 \\ 0.3202 \\ 0.3619 \end{array}$
$\begin{array}{c} \mathbf{i} \\ 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \\ 7 \\ 8 \\ 9 \\ 10 \\ 11 \\ 12 \\ 13 \\ 14 \\ 15 \\ 16 \end{array}$	$\begin{array}{c} \alpha_i \\ 0.1704 \\ 0.1636 \\ 0.1904 \\ 0.1393 \\ 0.2453 \\ 0.2453 \\ 0.2453 \\ 0.2582 \\ 0.1815 \\ 0.1963 \\ 0.2325 \\ 0.2203 \\ 0.1551 \\ 0.1676 \\ 0.2094 \\ 0.2452 \\ 0.1874 \\ 0.1691 \end{array}$	$\begin{array}{c} 0.0845\\ -\\ -\\ -\\ -\\ -\\ 0.1349\\ 0.1363\\ 0.0994\\ 0.1527\\ 0.1314\\ 0.2099\\ 0.1006\\ 0.1535\\ 0.1391\\ 0.1549\\ 0.1343\end{array}$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	NOISE 	$\begin{array}{r} \beta_i \\ 0.2447 \\ 0.2393 \\ 0.2673 \\ 0.2144 \\ 0.2532 \\ 0.2753 \\ 0.2315 \\ 0.2315 \\ 0.2735 \\ 0.2053 \\ 0.2346 \\ 0.2398 \\ 0.2384 \\ 0.2569 \\ 0.2177 \end{array}$	$\begin{array}{c} h_{i,i} \\ 0.1379 \\ 0.1361 \\ 0.1465 \\ 0.1249 \\ 0.1404 \\ 0.1521 \\ 0.1375 \\ 0.1454 \\ 0.1322 \\ 0.149 \\ 0.1213 \\ 0.1289 \\ 0.138 \\ 0.1331 \\ 0.1462 \\ 0.1269 \end{array}$	$\begin{array}{c} \alpha_i \\ \alpha_i \\ 0.4872 \\ 0.4755 \\ 0.4706 \\ 0.3966 \\ 0.6607 \\ 0.7509 \\ 0.5943 \\ 0.4706 \\ 0.6315 \\ 0.4383 \\ 0.5234 \\ 0.4503 \\ 0.4719 \\ 0.6829 \\ 0.5458 \\ 0.5228 \end{array}$	$\begin{array}{c} 0.3167\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\$	$\begin{array}{c} 20\% \ 1\\ g_{i,j}\\ -\\ -\\ -\\ -\\ -\\ 0.2871\\ 0.1906\\ 0.1282\\ -\\ 0.1967\\ -\\ -\\ -\\ 0.1967\\ -\\ -\\ -\\ 0.2062 \end{array}$	NOISE 	$\begin{array}{c} \beta_i \\ 0.7432 \\ 0.7173 \\ 0.7180 \\ 0.6231 \\ 0.6479 \\ 0.7515 \\ 0.7148 \\ 0.6570 \\ 0.6394 \\ 0.6512 \\ 0.6829 \\ 0.6785 \\ 0.6200 \\ 0.6529 \\ 0.7879 \\ 0.6737 \end{array}$	$\begin{array}{r} h_{i,i} \\ 0.3469 \\ 0.3381 \\ 0.3417 \\ 0.3100 \\ 0.3292 \\ 0.3463 \\ 0.3402 \\ 0.3199 \\ 0.3236 \\ 0.3221 \\ 0.3313 \\ 0.3314 \\ 0.3166 \\ 0.3202 \\ 0.3619 \\ 0.3358 \end{array}$
$\begin{array}{c} \mathbf{i} \\ 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \\ 7 \\ 8 \\ 9 \\ 10 \\ 11 \\ 12 \\ 13 \\ 14 \\ 15 \\ 16 \\ 17 \end{array}$	$\begin{array}{c} \alpha_i \\ 0.1704 \\ 0.1636 \\ 0.1904 \\ 0.1393 \\ 0.2453 \\ 0.2582 \\ 0.1815 \\ 0.2325 \\ 0.2203 \\ 0.1551 \\ 0.1676 \\ 0.2094 \\ 0.2452 \\ 0.1874 \\ 0.1691 \\ 0.1851 \end{array}$	$\begin{array}{c} 0.0845\\ -\\ -\\ -\\ -\\ -\\ -\\ 0.1349\\ 0.1363\\ 0.0994\\ 0.1527\\ 0.1314\\ 0.2099\\ 0.1006\\ 0.1326\\ 0.1535\\ 0.1391\\ 0.1549\\ 0.1343\\ 0.1375 \end{array}$	$\begin{array}{c} 10\% \ 1 \\ g_{i,j} \\ - \\ - \\ - \\ 0.1146 \\ 0.0969 \\ 0.0705 \\ - \\ 0.0853 \\ - \\ - \\ 0.0641 \\ - \end{array}$	NOISE 	$\begin{array}{r} \beta_i \\ 0.2447 \\ 0.2393 \\ 0.2673 \\ 0.2144 \\ 0.2532 \\ 0.2753 \\ 0.2379 \\ 0.2656 \\ 0.2315 \\ 0.2735 \\ 0.2053 \\ 0.2384 \\ 0.2384 \\ 0.2384 \\ 0.2569 \\ 0.2177 \\ 0.2427 \end{array}$	$\begin{array}{c} h_{i,i} \\ 0.1379 \\ 0.1361 \\ 0.1465 \\ 0.1249 \\ 0.1404 \\ 0.1521 \\ 0.1454 \\ 0.1375 \\ 0.1454 \\ 0.1322 \\ 0.149 \\ 0.1213 \\ 0.1289 \\ 0.138 \\ 0.1331 \\ 0.1462 \\ 0.1269 \\ 0.1362 \end{array}$	$\begin{array}{c} \alpha_i \\ 0.4872 \\ 0.4755 \\ 0.4706 \\ 0.3966 \\ 0.6607 \\ 0.7509 \\ 0.5943 \\ 0.4706 \\ 0.6315 \\ 0.4383 \\ 0.5234 \\ 0.4503 \\ 0.4719 \\ 0.6829 \\ 0.5458 \\ 0.5228 \\ 0.5719 \end{array}$	$\begin{array}{c} 0.3167\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\$	$\begin{array}{c} 20\% \ 1\\ g_{i,j}\\ -\\ -\\ -\\ -\\ -\\ 0.2871\\ 0.1906\\ 0.1282\\ -\\ 0.1967\\ -\\ -\\ -\\ 0.2062\\ -\\ -\end{array}$	NOISE 	$\begin{array}{c} \beta_i \\ 0.7432 \\ 0.7173 \\ 0.7180 \\ 0.6231 \\ 0.6479 \\ 0.7515 \\ 0.7148 \\ 0.6570 \\ 0.6394 \\ 0.6512 \\ 0.6829 \\ 0.6785 \\ 0.6200 \\ 0.6529 \\ 0.7879 \\ 0.6737 \\ 0.7128 \end{array}$	$\begin{array}{r} h_{i,i} \\ 0.3469 \\ 0.3381 \\ 0.3417 \\ 0.3100 \\ 0.3292 \\ 0.3463 \\ 0.3402 \\ 0.3199 \\ 0.3236 \\ 0.3221 \\ 0.3313 \\ 0.3314 \\ 0.3166 \\ 0.3202 \\ 0.3619 \\ 0.3358 \\ 0.3358 \end{array}$
$\begin{array}{c} \mathbf{i} \\ 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \\ 7 \\ 8 \\ 9 \\ 10 \\ 11 \\ 12 \\ 13 \\ 14 \\ 15 \\ 16 \\ 17 \\ 18 \end{array}$	$\begin{array}{c} \alpha_i \\ 0.1704 \\ 0.1636 \\ 0.1904 \\ 0.1393 \\ 0.2453 \\ 0.2582 \\ 0.1815 \\ 0.2325 \\ 0.2203 \\ 0.1551 \\ 0.1676 \\ 0.2094 \\ 0.2452 \\ 0.1874 \\ 0.1851 \\ 0.1496 \end{array}$	$\begin{array}{c} 0.0845\\ -\\ -\\ -\\ 0.1349\\ 0.1363\\ 0.0994\\ 0.1527\\ 0.1314\\ 0.2099\\ 0.1006\\ 0.1526\\ 0.1535\\ 0.1391\\ 0.1549\\ 0.1343\\ 0.1375\\ -\\ -\end{array}$	10% 1 $g_{i,j}$	NOISE 	$\begin{array}{c} \beta_i \\ 0.2447 \\ 0.2393 \\ 0.2673 \\ 0.2532 \\ 0.2753 \\ 0.2379 \\ 0.2656 \\ 0.2315 \\ 0.2053 \\ 0.2346 \\ 0.2398 \\ 0.2384 \\ 0.2569 \\ 0.2177 \\ 0.2427 \\ 0.2185 \\ \end{array}$	$\begin{array}{c} h_{i,i} \\ 0.1379 \\ 0.1361 \\ 0.1465 \\ 0.1249 \\ 0.1404 \\ 0.1521 \\ 0.1375 \\ 0.1454 \\ 0.1322 \\ 0.149 \\ 0.1213 \\ 0.1289 \\ 0.1318 \\ 0.1331 \\ 0.1462 \\ 0.1269 \\ 0.1362 \\ 0.1269 \\ 0.1261 \end{array}$	$\begin{array}{c} \alpha_i \\ 0.4872 \\ 0.4755 \\ 0.4706 \\ 0.3966 \\ 0.6607 \\ 0.7509 \\ 0.5943 \\ 0.4706 \\ 0.6315 \\ 0.4383 \\ 0.5234 \\ 0.4503 \\ 0.4719 \\ 0.6829 \\ 0.5458 \\ 0.5228 \\ 0.5719 \\ 0.5165 \end{array}$	$\begin{array}{c} 0.3167\\ -\\ -\\ 0.3350\\ 0.3441\\ 0.3196\\ 0.3749\\ 0.3199\\ 0.2868\\ 0.3017\\ 0.3933\\ 0.3215\\ 0.3933\\ 0.3215\\ 0.3639\\ 0.36626\\ 0.3902\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\$	$\begin{array}{c} 20\% \ \text{I} \\ g_{i,j} \\ - \\ - \\ - \\ - \\ 0.2871 \\ 0.1906 \\ 0.1282 \\ - \\ 0.1967 \\ - \\ - \\ 0.2062 \\ - \\ - \\ 0.2062 \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ $	NOISE 	$\begin{array}{c} \beta_i \\ 0.7432 \\ 0.7173 \\ 0.7173 \\ 0.6231 \\ 0.6231 \\ 0.7515 \\ 0.7515 \\ 0.7148 \\ 0.6570 \\ 0.6394 \\ 0.6512 \\ 0.6829 \\ 0.6785 \\ 0.6200 \\ 0.6785 \\ 0.6200 \\ 0.6787 \\ 0.7879 \\ 0.77128 \\ 0.6737 \\ 0.7128 \\ 0.7717 \end{array}$	$\begin{array}{c} h_{i,i} \\ 0.3469 \\ 0.3381 \\ 0.3417 \\ 0.3100 \\ 0.3292 \\ 0.3463 \\ 0.3402 \\ 0.3199 \\ 0.3236 \\ 0.3221 \\ 0.3313 \\ 0.3313 \\ 0.3313 \\ 0.3316 \\ 0.3202 \\ 0.3619 \\ 0.3358 \\ 0.3358 \\ 0.3358 \\ 0.3550 \end{array}$
$\begin{array}{c} \mathbf{i} \\ 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \\ 7 \\ 8 \\ 9 \\ 10 \\ 11 \\ 12 \\ 13 \\ 14 \\ 15 \\ 16 \\ 17 \\ 18 \\ 19 \end{array}$	$\begin{array}{c} \alpha_i \\ \alpha_i \\ 0.1704 \\ 0.1636 \\ 0.1904 \\ 0.1393 \\ 0.2453 \\ 0.2582 \\ 0.1815 \\ 0.1963 \\ 0.2253 \\ 0.2203 \\ 0.1557 \\ 0.2203 \\ 0.1557 \\ 0.2203 \\ 0.1576 \\ 0.2094 \\ 0.1676 \\ 0.2094 \\ 0.1874 \\ 0.1681 \\ 0.1496 \\ 0.1456 \end{array}$	$\begin{array}{c} 0.0845\\ -\\ -\\ -\\ 0.1363\\ 0.0994\\ 0.1527\\ 0.1314\\ 0.2099\\ 0.1026\\ 0.1326\\ 0.1326\\ 0.1326\\ 0.1326\\ 0.1343\\ 0.1343\\ 0.1375\\ -\\ 0.1894 \end{array}$	10% 1 $g_{i,j}$ - - - 0.1146 0.0969 0.0705 - - 0.0853 - - - 0.0641 - - - - - - - - - - - - -	NOISE 	$\begin{array}{c} \beta_i \\ 0.2447 \\ 0.2393 \\ 0.2673 \\ 0.2144 \\ 0.2532 \\ 0.2735 \\ 0.2379 \\ 0.26566 \\ 0.2315 \\ 0.2735 \\ 0.2036 \\ 0.2344 \\ 0.2569 \\ 0.2138 \\ 0.2427 \\ 0.2427 \\ 0.2427 \\ 0.2427 \\ 0.2415 \\ 0.2113 \\ 0.2115 $	$\begin{array}{c} h_{i,i} \\ 0.1379 \\ 0.1361 \\ 0.1465 \\ 0.1249 \\ 0.1404 \\ 0.1521 \\ 0.1375 \\ 0.1454 \\ 0.1375 \\ 0.1454 \\ 0.1322 \\ 0.149 \\ 0.1213 \\ 0.1289 \\ 0.138 \\ 0.1381 \\ 0.1462 \\ 0.1269 \\ 0.1362 \\ 0.1261 \\ 0.1234 \end{array}$	$\begin{array}{c} \alpha_i \\ \alpha_i \\ 0.4872 \\ 0.4755 \\ 0.4706 \\ 0.3966 \\ 0.6607 \\ 0.7509 \\ 0.5943 \\ 0.4706 \\ 0.6315 \\ 0.4383 \\ 0.5234 \\ 0.4503 \\ 0.4719 \\ 0.6829 \\ 0.5458 \\ 0.5228 \\ 0.5719 \\ 0.5165 \\ 0.5468 \end{array}$	$\begin{array}{c} 0.3167\\ -\\ -\\ 0.3350\\ 0.3441\\ 0.3196\\ 0.3749\\ 0.2868\\ 0.3019\\ 0.2868\\ 0.3012\\ 0.3933\\ 0.3215\\ 0.3933\\ 0.3215\\ 0.3933\\ 0.3215\\ 0.3932\\ -\\ 0.3932\\ 0.3639\\ 0.3902\\ -\\ 0.5373\end{array}$	$\begin{array}{c} 20\% \ {\rm f} \\ g_{i,j} \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ $	VOISE	$\begin{array}{c} \beta_i \\ 0.7432 \\ 0.7173 \\ 0.7180 \\ 0.6231 \\ 0.6479 \\ 0.7515 \\ 0.7148 \\ 0.6570 \\ 0.6394 \\ 0.6512 \\ 0.6829 \\ 0.6785 \\ 0.6200 \\ 0.6785 \\ 0.6200 \\ 0.67879 \\ 0.6737 \\ 0.6737 \\ 0.7128 \\ 0.7717 \\ 0.7659 \end{array}$	$\begin{array}{c} h_{i,i} \\ 0.3469 \\ 0.3381 \\ 0.3417 \\ 0.3100 \\ 0.3292 \\ 0.3463 \\ 0.3402 \\ 0.3492 \\ 0.3199 \\ 0.3236 \\ 0.3221 \\ 0.3313 \\ 0.3221 \\ 0.3313 \\ 0.3136 \\ 0.3202 \\ 0.3619 \\ 0.3358 \\ 0.3555 \\ 0.3555 \\ 0.3555 \\ 0.3556 \\ 0.35$
$\begin{array}{c} \mathbf{i} \\ \mathbf{i} \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \\ 7 \\ 8 \\ 9 \\ 9 \\ 10 \\ 11 \\ 12 \\ 13 \\ 14 \\ 15 \\ 16 \\ 17 \\ 18 \\ 19 \\ 20 \end{array}$	$\begin{array}{c} \alpha_i \\ 0.1704 \\ 0.1636 \\ 0.1904 \\ 0.1393 \\ 0.2453 \\ 0.2582 \\ 0.1815 \\ 0.2255 \\ 0.2205 \\ 0.1963 \\ 0.1551 \\ 0.1676 \\ 0.2944 \\ 0.2452 \\ 0.1874 \\ 0.1491 \\ 0.1453 \\ 0.1453 \\ 0.1811 \\$	$\begin{array}{c} 0.0845\\ -\\ -\\ 0.1349\\ 0.1363\\ 0.0994\\ 0.1527\\ 0.1314\\ 0.2096\\ 0.1326\\ 0.1336\\ 0.1535\\ 0.1391\\ 0.1535\\ 0.1343\\ 0.1375\\ -\\ 0.1894\\ 0.1172 \end{array}$	$\begin{array}{c} 10\% 1 \\ g_{i,j} \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ $	NOISE 	$\begin{array}{c} \beta_i \\ 0.2447 \\ 0.2393 \\ 0.2673 \\ 0.2144 \\ 0.2532 \\ 0.2753 \\ 0.2379 \\ 0.2656 \\ 0.2315 \\ 0.2053 \\ 0.2346 \\ 0.2534 \\ 0.2538 \\ 0.2384 \\ 0.2588 \\ 0.2384 \\ 0.2588 \\ 0.2384 \\ 0.2588 \\ 0.2117 \\ 0.2427 \\ 0.2113 \\ 0.2113 \\ 0.2113 \\ 0.2113 \\ 0.2113 \\ 0.2147 \\ 0.2113 \\ 0.2113 \\ 0.2147 \\ 0.2147 \\ 0.2145 \\ 0.2113 \\ 0.2113 \\ 0.2147 \\ 0.2145 \\ 0.2113 \\ 0.2147 \\ 0.2145 \\ 0.2113 \\ 0.2147 \\ 0.2147 \\ 0.2145 \\ 0.2113 \\ 0.2147 \\ 0.2147 \\ 0.2145 \\ 0.2113 \\ 0.2147 \\ 0.2147 \\ 0.2145 \\ 0.2113 \\ 0.2147 \\ 0.2147 \\ 0.2145 \\ 0.2113 \\ 0.2147 \\ 0.2145 \\ 0.2113 \\ 0.2147 \\ 0.2145 \\ 0.2113 \\ 0.2147 \\ 0.2145 \\ 0.2113 \\ 0.2145 \\ 0.215 \\ 0.2113 \\ 0.215 \\ $	$\begin{array}{c} h_{i,i} \\ 0.1379 \\ 0.1361 \\ 0.1465 \\ 0.1249 \\ 0.1404 \\ 0.1521 \\ 0.1375 \\ 0.1404 \\ 0.1521 \\ 0.1375 \\ 0.1454 \\ 0.1322 \\ 0.149 \\ 0.1213 \\ 0.1289 \\ 0.1331 \\ 0.1462 \\ 0.1261 \\ 0.1264 \\ 0.1264 \\ 0.1204 \end{array}$	$\begin{array}{c} \alpha_i \\ 0.4872 \\ 0.4755 \\ 0.4706 \\ 0.3966 \\ 0.6607 \\ 0.7509 \\ 0.5943 \\ 0.4706 \\ 0.6315 \\ 0.4383 \\ 0.5234 \\ 0.4503 \\ 0.4719 \\ 0.6829 \\ 0.5458 \\ 0.5719 \\ 0.5458 \\ 0.5719 \\ 0.5165 \\ 0.5468 \\ 0.5896 \end{array}$	$\begin{matrix} & & & & & & & & & & & & & & & & & & &$	20% f $g_{i,j}$ - - - - - - - - - - - - -	VOISE 	$\begin{array}{c} \beta_i\\ 0.7432\\ 0.7173\\ 0.7231\\ 0.6231\\ 0.6231\\ 0.6479\\ 0.7515\\ 0.7148\\ 0.6512\\ 0.6394\\ 0.6512\\ 0.6829\\ 0.6785\\ 0.6200\\ 0.6529\\ 0.6785\\ 0.6200\\ 0.6529\\ 0.6737\\ 0.7128\\ 0.6737\\ 0.7128\\ 0.7717\\ 0.7659\\ 0.7044\end{array}$	$\begin{array}{c} h_{i,i} \\ 0.3469 \\ 0.3381 \\ 0.3410 \\ 0.3292 \\ 0.3463 \\ 0.3402 \\ 0.3236 \\ 0.3236 \\ 0.3236 \\ 0.3231 \\ 0.3314 \\ 0.3314 \\ 0.3316 \\ 0.33202 \\ 0.3619 \\ 0.3358 \\ 0.3358 \\ 0.3358 \\ 0.33556 \\ 0.3556 \\ 0.3356 \\ 0.3556 \\ 0.3556 \\ 0.3556 \\ 0.3556 \\ 0.3556 \\ 0.$
$\begin{array}{c} & \mathbf{i} \\ & \mathbf{i} \\ & 2 \\ & 3 \\ & 4 \\ & 5 \\ & 6 \\ & 7 \\ & 8 \\ & 9 \\ & 10 \\ & 11 \\ & 12 \\ & 13 \\ & 14 \\ & 15 \\ & 16 \\ & 17 \\ & 18 \\ & 19 \\ & 20 \\ & 21 \end{array}$	$\begin{array}{c} \alpha_i \\ \alpha_i \\ 0.1704 \\ 0.1636 \\ 0.1904 \\ 0.1393 \\ 0.2453 \\ 0.2582 \\ 0.1815 \\ 0.2252 \\ 0.2203 \\ 0.1551 \\ 0.1676 \\ 0.2942 \\ 0.1851 \\ 0.2452 \\ 0.1874 \\ 0.2452 \\ 0.1874 \\ 0.1453 \\ 0.1453 \\ 0.1453 \\ 0.1811 \\ 0.1821 \\ 0.$	$\begin{array}{c} 0.0845\\ -\\ -\\ -\\ 0.1363\\ 0.0994\\ 0.1526\\ 0.1314\\ 0.2099\\ 0.1326\\ 0.1326\\ 0.1326\\ 0.1326\\ 0.1333\\ 0.1375\\ -\\ -\\ 0.1894\\ 0.1172\\ 0.1342 \end{array}$	10% 1 $g_{i,j}$	NOISE 	$\begin{array}{c} \beta_i \\ 0.2447 \\ 0.2393 \\ 0.2673 \\ 0.2144 \\ 0.2532 \\ 0.2753 \\ 0.2379 \\ 0.2655 \\ 0.2335 \\ 0.2346 \\ 0.2384 \\ 0.2569 \\ 0.2384 \\ 0.2569 \\ 0.2384 \\ 0.2569 \\ 0.2177 \\ 0.2427 \\ 0.2427 \\ 0.2427 \\ 0.2123 \\ 0.2113 \\ 0.2147 \\ 0.21247 \\ 0.2125 \\ 0.21213 \\ 0.2147 \\ 0.21247 \\ 0.2125 \\ 0.2123 \\ 0.21247 \\ 0.2125 \\ 0.2123 \\ 0.21247 \\ 0.2125 \\ 0.2123 \\ 0.21247 \\ 0.2125 \\ 0.2123 \\ 0.21247 \\ 0.2255 \\ 0.2123 \\ 0.21247 \\ 0.2255 \\ 0.2123 \\ 0.21247 \\ 0.2255 \\ 0.2123 \\ 0.21247 \\ 0.2255 \\ 0.2123 \\ 0.21247 \\ 0.2255$	$\begin{array}{c} h_{i,i} \\ 0.1379 \\ 0.1361 \\ 0.1465 \\ 0.1249 \\ 0.1404 \\ 0.1521 \\ 0.1404 \\ 0.1521 \\ 0.1454 \\ 0.1375 \\ 0.1454 \\ 0.1322 \\ 0.1213 \\ 0.1289 \\ 0.138 \\ 0.138 \\ 0.138 \\ 0.1381 \\ 0.1462 \\ 0.1269 \\ 0.1362 \\ 0.1261 \\ 0.1264 \\ 0.1306 \\ 0.1323 \\ 0.1306 $	$\begin{array}{c} \alpha_i \\ 0.4872 \\ 0.4755 \\ 0.4706 \\ 0.3966 \\ 0.6607 \\ 0.7509 \\ 0.5943 \\ 0.4706 \\ 0.6315 \\ 0.4383 \\ 0.4706 \\ 0.6315 \\ 0.4383 \\ 0.4719 \\ 0.6829 \\ 0.5458 \\ 0.5228 \\ 0.5719 \\ 0.5165 \\ 0.5468 \\ 0.5896 \\ 0.5896 \\ 0.5896 \end{array}$	0.3167 - - 0.3350 0.3441 0.3196 0.3749 0.2868 0.3017 0.3933 0.3017 0.3933 0.3217 0.3626 0.3626 0.3626 0.3629 - 0.3629 0.3629 0.3629 0.3629 0.3629 0.3629 0.3629 0.3629 0.3629 0.3649 0.319 0.3196 0.3196 0.3196 0.3196 0.3196 0.3196 0.3196 0.3196 0.3196 0.3196 0.3196 0.3197 0.3317 0.3337 0.3933 0.3217 0.3347 0.3629 0.3629 0.3629 0.3629 0.3477 0.3629 0.5573 0.3922 0.3427 0.3629 0.3629 0.5573 0.3924 0.3629 0.3629 0.5573 0.3924 0.3629 0.3629 0.55773 0.32940 0.3227 0.3277 0.3227 0.32777 0.32777 0.32777 0.32777 0.32777 0.32777 0.3277	$\begin{array}{c} 20\% \ {\rm f} \\ g_{i,j} \\ - \\ - \\ - \\ - \\ 0.2871 \\ 0.1282 \\ - \\ 0.1282 \\ - \\ 0.1282 \\ - \\ 0.1282 \\ - \\ - \\ 0.2062 \\ - \\ - \\ - \\ 0.2062 \\ - \\ - \\ - \\ 0.2435 \\ - \end{array}$	NOISE 	$\begin{array}{c} \beta_i \\ 0.7432 \\ 0.7432 \\ 0.7173 \\ 0.6231 \\ 0.6479 \\ 0.7515 \\ 0.7148 \\ 0.6570 \\ 0.6394 \\ 0.6512 \\ 0.6394 \\ 0.6529 \\ 0.6829 \\ 0.6829 \\ 0.6785 \\ 0.6209 \\ 0.7128 \\ 0.7717 \\ 0.7128 \\ 0.7717 \\ 0.7718 \\ 0.7717 \\ 0.7659 \\ 0.7044 \\ 0.6678 \end{array}$	$\begin{array}{c} h_{i,i} \\ 0.3469 \\ 0.3381 \\ 0.3417 \\ 0.3100 \\ 0.3292 \\ 0.3463 \\ 0.3402 \\ 0.3292 \\ 0.3236 \\ 0.3221 \\ 0.3231 \\ 0.3313 \\ 0.3314 \\ 0.3164 \\ 0.3202 \\ 0.3619 \\ 0.3358 \\ 0.3556 \\ 0.3358 \\ 0.3556 \\ 0.3358 \\ 0.3550 \\ 0.3358 \\ 0.3550 \\ 0.3358 \\ 0.3550 \\ 0.3336 \\ 0.3550 \\ 0.3336 \\ 0.3550 \\ 0.3336 \\ 0.3550 \\ 0.3336 \\ 0.3550 \\ 0.3330 \\ 0.3292 \\ 0.3292 \\ 0.3292 \\ 0.3292 \\ 0.3292 \\ 0.3330 \\ 0.3292 \\ 0.3292 \\ 0.3292 \\ 0.3330 \\ 0.3292 \\ 0.3292 \\ 0.3330 \\ 0.3292 \\ 0.3292 \\ 0.330 \\ 0.3292 \\ 0.3292 \\ 0.3292 \\ 0.3292 \\ 0.3292 \\ 0.3292 \\ 0.3292 \\ 0.3292 \\ 0.3292 \\ 0.3292 \\ 0.3292 \\ 0.3292 \\ 0.3292 \\ 0.3292 \\ 0.3292 \\ 0.3314 \\ 0.3292 \\ 0.3314 \\ 0.3314 \\ 0.3314 \\ 0.3314 \\ 0.3358 \\ 0.3358 \\ 0.3358 \\ 0.3358 \\ 0.3358 \\ 0.3358 \\ 0.3358 \\ 0.3358 \\ 0.3358 \\ 0.3358 \\ 0.3320 \\ 0.330 \\ 0.320$
$\begin{array}{c} \mathbf{i} \\ 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \\ 7 \\ 8 \\ 9 \\ 10 \\ 11 \\ 12 \\ 13 \\ 14 \\ 15 \\ 16 \\ 17 \\ 18 \\ 19 \\ 20 \\ 21 \\ 20 \\ 22 \end{array}$	$\begin{array}{c} \alpha_i \\ 0.1704 \\ 0.1636 \\ 0.1904 \\ 0.1393 \\ 0.2453 \\ 0.2582 \\ 0.1815 \\ 0.2205 \\ 0.2205 \\ 0.1963 \\ 0.2325 \\ 0.2203 \\ 0.1551 \\ 0.1676 \\ 0.2034 \\ 0.2452 \\ 0.2044 \\ 0.1661 \\ 0.1451 \\ 0.1496 \\ 0.1453 \\ 0.1811 \\ 0.1811 \\ 0.1812 \\ 0.1822 \\ 0.1984 \\$	$\begin{array}{c} 0.0845 \\ - \\ - \\ 0.1349 \\ 0.1363 \\ 0.0994 \\ 0.1527 \\ 0.1314 \\ 0.2009 \\ 0.1006 \\ 0.1326 \\ 0.1326 \\ 0.1339 \\ 0.1343 \\ 0.1375 \\ - \\ 0.1843 \\ 0.1375 \\ - \\ 0.1342 \\ 0.1342 \\ 0.1565 \\ 0.1542 \\ 0.1565 \\ - \\ 0.1542 \\ 0.1565 \\ - \\ 0.1542 \\ 0.1565 \\ - \\ 0$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	NOISE 	$\begin{array}{c} \beta_i \\ 0.2447 \\ 0.2332 \\ 0.2673 \\ 0.2144 \\ 0.2532 \\ 0.2753 \\ 0.2379 \\ 0.2656 \\ 0.2315 \\ 0.2053 \\ 0.2053 \\ 0.2346 \\ 0.2384 \\ 0.2569 \\ 0.2177 \\ 0.2425 \\ 0.2113 \\ 0.2147 \\ 0.2254 \\ 0.2313 \\ 0.2364 \\ 0.2113 \\ 0.2254 \\ 0.2254 \\ 0.2364 \\$	$\begin{array}{c} h_{i,i} \\ 0.1379 \\ 0.1361 \\ 0.1465 \\ 0.1249 \\ 0.1404 \\ 0.1521 \\ 0.1375 \\ 0.1454 \\ 0.1375 \\ 0.1454 \\ 0.1233 \\ 0.1289 \\ 0.131 \\ 0.1269 \\ 0.1362 \\ 0.1261 \\ 0.1264 \\ 0.1224 \\ 0.1224 \\ 0.1224 \\ 0.1306 \\ 0.1323 \\ 0.1328 \\ 0.1328 \\ 0.1328 \\ 0.1328 \\ 0.1328 \\ 0.1328 \\ 0.1328 \\ 0.1328 \\ 0.1284 \\ 0.1306 \\ 0.1328 \\ 0.1284 \\ 0.1328 \\ 0.1284 \\ 0.1306 \\ 0.1328 \\ 0.1284 \\ 0.1306 \\ 0.1328 \\ 0.1284 \\ 0.1306 \\ 0.1328 \\ 0.1284 \\ 0.1306 \\ 0.1328 \\ 0.1284 \\ 0.1306 \\ 0.1328 \\ 0.1284 \\ 0.1306 \\ 0.1328 \\ 0.1284 \\ 0.1306 \\ 0.1328 \\ 0.1284 \\ 0.1306 \\ 0.1328 \\ 0.1284 \\ 0.1306 \\ 0.1328 \\ 0.1284 \\ 0.1306 \\ 0.1328 \\ 0.1328 \\ 0.1388 \\ 0.13$	$\begin{array}{c} \alpha_i \\ 0.4872 \\ 0.4755 \\ 0.4706 \\ 0.3966 \\ 0.6607 \\ 0.7509 \\ 0.5943 \\ 0.4706 \\ 0.6315 \\ 0.4383 \\ 0.5234 \\ 0.4503 \\ 0.5234 \\ 0.4503 \\ 0.5234 \\ 0.5228 \\ 0.5719 \\ 0.5468 \\ 0.5228 \\ 0.5719 \\ 0.5165 \\ 0.5468 \\ 0.5896 \\ 0.5200 \\ 0.5223 \end{array}$	0.3167 - - 0.3350 0.3441 0.3196 0.3749 0.3199 0.2868 0.3017 0.3933 0.3215 0.3347 0.3628 0.3628 0.3626 0.3217 0.3626 0.3626 0.3626 0.3217 0.3626 0.3217 0.3626 0.3217 0.3626 0.3626 0.3217 0.3626 0.3627 0.35777 0.3577 0.3577 0.3577 0.3577 0.3577 0.3577 0.3577 0.3577	20% f 9i,j - - - 0.1906 0.1282 - 0.1967 - - 0.2062 - - 0.2062 - - - 0.2435 -	VOISE 	$\begin{array}{c} \beta_i \\ 0.7432 \\ 0.7173 \\ 0.6231 \\ 0.6231 \\ 0.6231 \\ 0.6479 \\ 0.7515 \\ 0.7148 \\ 0.6570 \\ 0.6394 \\ 0.6529 \\ 0.6785 \\ 0.6200 \\ 0.6529 \\ 0.6785 \\ 0.6200 \\ 0.6529 \\ 0.6737 \\ 0.7127 \\ 0.7659 \\ 0.7717 \\ 0.7659 \\ 0.7717 \\ 0.76659 \\ 0.7717 \\ 0.7659 \\ 0.7717 \\ 0.7659 \\ 0.7717 \\ 0.7659 \\ 0.7717 \\ 0.7659 \\ 0.7717 \\ 0.7659 \\ 0.7717 \\ 0.7649 \\ 0.6781 \\ 0.6581 $	$\begin{array}{c} h_{i,i} \\ 0.3469 \\ 0.3481 \\ 0.3100 \\ 0.3100 \\ 0.3292 \\ 0.3463 \\ 0.3402 \\ 0.3236 \\ 0.3236 \\ 0.3231 \\ 0.3313 \\ 0.3314 \\ 0.3316 \\ 0.3202 \\ 0.3358 \\ 0.3556 \\ 0.3556 \\ 0.3556 \\ 0.3556 \\ 0.3556 \\ 0.3556 \\ 0.3556 \\ 0.3526 \\ 0.3526 \\ 0.3320 \\ 0.3292 \\ 0.3181 \\ 0.3186 \\ 0.3292 \\ 0.3181 \\ 0.3186 \\ 0.3292 \\ 0.3181 \\ 0.3181 \\ 0.3186 \\ 0.3292 \\ 0.3181 \\ 0.31$
$\begin{array}{c} & \mathbf{i} \\ & \mathbf{i} \\ & 2 \\ & 3 \\ & 4 \\ & 5 \\ & 6 \\ & 7 \\ & 8 \\ & 9 \\ & 10 \\ & 11 \\ & 12 \\ & 13 \\ & 14 \\ & 15 \\ & 16 \\ & 17 \\ & 18 \\ & 19 \\ & 20 \\ & 21 \\ & 22 \\ & 23 \end{array}$	$\begin{array}{c} \alpha_i \\ \alpha_i \\ 0.1704 \\ 0.1636 \\ 0.1934 \\ 0.1393 \\ 0.2453 \\ 0.2582 \\ 0.1815 \\ 0.2252 \\ 0.1815 \\ 0.2223 \\ 0.1551 \\ 0.1676 \\ 0.2094 \\ 0.2452 \\ 0.1874 \\ 0.2452 \\ 0.1881 \\ 0.1453 \\ 0.1453 \\ 0.1453 \\ 0.1811 \\ 0.1832 \\ 0.1889 \\ 0.1449 \end{array}$	$\begin{array}{c} 0.0845 \\ - \\ - \\ 0.1363 \\ 0.0994 \\ 0.1534 \\ 0.1314 \\ 0.2099 \\ 0.1326 \\ 0.1326 \\ 0.1326 \\ 0.1331 \\ 0.1343 \\ 0.1375 \\ - \\ 0.1894 \\ 0.1172 \\ 0.1894 \\ 0.1172 \\ 0.1345 \\ 0.1345 \\ - \\ 0.1894 \\ 0.1565 \\ 0.1216 $	10% 1 $g_{i,j}$	NOISE 	$\begin{array}{c} \beta_i \\ 0.2447 \\ 0.2393 \\ 0.2733 \\ 0.2144 \\ 0.2532 \\ 0.2735 \\ 0.2379 \\ 0.2655 \\ 0.2735 \\ 0.2346 \\ 0.2384 \\ 0.2569 \\ 0.2384 \\ 0.2569 \\ 0.2384 \\ 0.2569 \\ 0.2384 \\ 0.2177 \\ 0.2427 \\ 0.2147 \\ 0.2147 \\ 0.2147 \\ 0.2147 \\ 0.2163 \\ 0.2113 \\ 0.2147 \\ 0.2254 \\ 0.2303 \\ 0.2163 \\$	$\begin{array}{c} h_{i,i} \\ 0.1379 \\ 0.1361 \\ 0.1465 \\ 0.1249 \\ 0.1404 \\ 0.1521 \\ 0.1375 \\ 0.1454 \\ 0.1322 \\ 0.149 \\ 0.1213 \\ 0.1289 \\ 0.1331 \\ 0.1462 \\ 0.1269 \\ 0.1362 \\ 0.1264 \\ 0.1234 \\ 0.128$	$\begin{array}{c} \alpha_i \\ 0.4872 \\ 0.4755 \\ 0.4706 \\ 0.3966 \\ 0.6607 \\ 0.7509 \\ 0.5943 \\ 0.4706 \\ 0.6315 \\ 0.4383 \\ 0.4503 \\ 0.5234 \\ 0.4503 \\ 0.4503 \\ 0.5234 \\ 0.5228 \\ 0.5458 \\ 0.55468 \\ 0.5896 \\ 0.5200 \\ 0.5223 \\ 0.5127 \end{array}$	$\begin{array}{c} 0.3167\\ -\\ -\\ -\\ 0.3431\\ 0.3196\\ 0.3196\\ 0.3199\\ 0.2868\\ 0.3017\\ 0.3933\\ 0.3215\\ 0.3347\\ 0.3639\\ 0.3447\\ 0.3626\\ 0.3902\\ -\\ -\\ 0.5373\\ 0.2940\\ 0.3221\\ 0.35500\\ 0.35500$	$20\%$ f $g_{i,j}$	NOISE	$\begin{array}{c} \beta_i \\ 0.7432 \\ 0.7432 \\ 0.7173 \\ 0.6231 \\ 0.6231 \\ 0.6231 \\ 0.6512 \\ 0.6394 \\ 0.6512 \\ 0.6394 \\ 0.6529 \\ 0.6785 \\ 0.6200 \\ 0.6529 \\ 0.7879 \\ 0.7128 \\ 0.7717 \\ 0.7128 \\ 0.7717 \\ 0.7659 \\ 0.7044 \\ 0.6678 \\ 0.6581 \\ 0.6581 \\ 0.6581 \\ 0.6581 \\ 0.6581 \\ 0.6581 \\ 0.6581 \\ 0.6581 \\ 0.6581 \\ 0.6581 \\ 0.6581 \\ 0.6581 \\ 0.6581 \\ 0.6581 \\ 0.6581 \\ 0.6581 \\ 0.6581 \\ 0.6581 \\ 0.6581 \\ 0.548 \\ 0.6581 \\ 0.5581 \\ $	$\begin{array}{c} h_{i,i} \\ 0.3469 \\ 0.3381 \\ 0.3417 \\ 0.3100 \\ 0.3292 \\ 0.3463 \\ 0.3402 \\ 0.3221 \\ 0.3221 \\ 0.3221 \\ 0.3314 \\ 0.3166 \\ 0.3202 \\ 0.3619 \\ 0.3358 \\ 0.3358 \\ 0.3355 \\ 0.3355 \\ 0.3556 \\ 0.3330 \\ 0.3556 \\ 0.330 \\ 0.3556 \\ 0.330 \\ 0.3556 \\ 0.330 \\ 0.3556 \\ 0.3556 \\ 0.330 \\ 0.3556 \\ 0.3556 \\ 0.330 \\ 0.3556 \\ $
$\begin{array}{c} \mathbf{i} \\ 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \\ 7 \\ 8 \\ 9 \\ 10 \\ 11 \\ 12 \\ 13 \\ 14 \\ 15 \\ 16 \\ 17 \\ 18 \\ 19 \\ 20 \\ 21 \\ 22 \\ 23 \\ 24 \end{array}$	$\begin{array}{c} \alpha_i \\ 0.1704 \\ 0.1636 \\ 0.1904 \\ 0.1393 \\ 0.2453 \\ 0.2582 \\ 0.1815 \\ 0.2253 \\ 0.2225 \\ 0.2203 \\ 0.2235 \\ 0.2203 \\ 0.2252 \\ 0.2203 \\ 0.2204 \\ 0.2094 \\ 0.2452 \\ 0.2094 \\ 0.2452 \\ 0.2094 \\ 0.2452 \\ 0.2094 \\ 0.2452 \\ 0.2094 \\ 0.1453 \\ 0.1496 \\ 0.1453 \\ 0.1496 \\ 0.1453 \\ 0.1811 \\ 0.1832 \\ 0.1811 \\ 0.1832 \\ 0.1812 \\$	$\begin{array}{c} 0.0845 \\ - \\ - \\ 0.1349 \\ 0.1363 \\ 0.0994 \\ 0.1527 \\ 0.1314 \\ 0.2099 \\ 0.1006 \\ 0.1325 \\ 0.13391 \\ 0.1535 \\ 0.1343 \\ 0.1375 \\ - \\ 0.1842 \\ 0.1142 \\ 0.1172 \\ 0.1342 \\ 0.1565 \\ 0.1216 \\ 0.1167 \end{array}$	10% 1 $g_{i,j}$ - - - - - - - - - - - - -	NOISE 	$\begin{array}{c} \beta_i \\ 0.2447 \\ 0.2332 \\ 0.2673 \\ 0.2144 \\ 0.2532 \\ 0.2753 \\ 0.2379 \\ 0.2656 \\ 0.2315 \\ 0.2053 \\ 0.2053 \\ 0.2384 \\ 0.2539 \\ 0.2384 \\ 0.2589 \\ 0.2117 \\ 0.2185 \\ 0.2113 \\ 0.2145 \\ 0.2113 \\ 0.2165 \\ 0.2113 \\ 0.2254 \\ 0.2254 \\ 0.2254 \\ 0.2264 \\ 0.2601 \\$	$\begin{array}{c} h_{i,i} \\ 0.1379 \\ 0.1361 \\ 0.1465 \\ 0.1249 \\ 0.1404 \\ 0.1521 \\ 0.1375 \\ 0.1454 \\ 0.1375 \\ 0.1454 \\ 0.1322 \\ 0.149 \\ 0.1289 \\ 0.138 \\ 0.138 \\ 0.138 \\ 0.138 \\ 0.1269 \\ 0.1362 \\ 0.1264 \\ 0.1224 \\ 0.1306 \\ 0.1323 \\ 0.1284 \\ 0.1284 \\ 0.1284 \\ 0.1282 \\ 0.152 \end{array}$	$\begin{array}{c} \alpha_i \\ 0.4872 \\ 0.4755 \\ 0.4706 \\ 0.3966 \\ 0.6607 \\ 0.7509 \\ 0.5943 \\ 0.4706 \\ 0.6315 \\ 0.4383 \\ 0.5234 \\ 0.4503 \\ 0.5234 \\ 0.4503 \\ 0.4719 \\ 0.6829 \\ 0.5458 \\ 0.5719 \\ 0.5468 \\ 0.5228 \\ 0.5719 \\ 0.5468 \\ 0.5200 \\ 0.5223 \\ 0.5127 \\ 0.5327 \end{array}$	$\begin{array}{c} 0.3167\\ -\\ -\\ 0.3350\\ 0.3441\\ 0.3196\\ 0.3749\\ 0.3199\\ 0.3017\\ 0.3933\\ 0.3215\\ 0.3347\\ 0.3626\\ 0.3902\\ -\\ -\\ 0.5373\\ 0.2940\\ 0.3221\\ 0.3551\\ 0.3551\\ 0.3551\\ 0.2667\\ 0.3551\\ 0.3$	20% 1 9i,j - - - 0.1906 0.1282 - 0.1906 0.1282 - 0.2062 - - 0.2062 - - 0.2435 - - 0.2435 - - 0.2450 - - - - - - - - - - - - -	VOISE	$\begin{array}{c} \beta_i \\ 0.7432 \\ 0.7173 \\ 0.6231 \\ 0.6231 \\ 0.6479 \\ 0.7515 \\ 0.7180 \\ 0.6572 \\ 0.6572 \\ 0.6529 \\ 0.6785 \\ 0.6200 \\ 0.6529 \\ 0.6785 \\ 0.6200 \\ 0.6529 \\ 0.6737 \\ 0.7128 \\ 0.7717 \\ 0.7659 \\ 0.7717 \\ 0.7542 \\$	$\begin{array}{c} h_{i,i} \\ 0.3469 \\ 0.3381 \\ 0.3100 \\ 0.3292 \\ 0.3417 \\ 0.3402 \\ 0.3236 \\ 0.3226 \\ 0.3236 \\ 0.3211 \\ 0.3313 \\ 0.3314 \\ 0.3314 \\ 0.3316 \\ 0.3202 \\ 0.3358 \\ 0.3550 \\ 0.3556 \\ 0.356 \\ 0.356$
$\begin{array}{c} \mathbf{i} \\ \mathbf{i} \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \\ 7 \\ 8 \\ 9 \\ 9 \\ 10 \\ 11 \\ 12 \\ 13 \\ 14 \\ 15 \\ 16 \\ 17 \\ 18 \\ 19 \\ 20 \\ 21 \\ 22 \\ 23 \\ 24 \\ 25 \end{array}$	$\begin{array}{c} \alpha_i \\ \alpha_i \\ 0.1704 \\ 0.1636 \\ 0.1904 \\ 0.1393 \\ 0.2453 \\ 0.2582 \\ 0.1815 \\ 0.2252 \\ 0.2203 \\ 0.1551 \\ 0.1676 \\ 0.2024 \\ 0.2452 \\ 0.1691 \\ 0.14851 \\ 0.1495 \\ 0.1453 \\ 0.14851 \\ 0.1493 \\ 0.1831 \\ 0.1832 \\ 0.18811 \\ 0.1832 \\ 0.1889 \\ 0.1442 \\ 0.1875 \\ 0.1700 \\$	$\begin{array}{c} 0.0845 \\ - \\ - \\ 0.1363 \\ 0.0994 \\ 0.1527 \\ 0.1314 \\ 0.2099 \\ 0.1006 \\ 0.1326 \\ 0.1331 \\ 0.1535 \\ 0.1391 \\ 0.1543 \\ 0.1375 \\ - \\ 0.1894 \\ 0.1172 \\ 0.1342 \\ 0.1565 \\ 0.1216 \\ 0.1167 \\ 0.1457 \end{array}$	10% 1 $g_{i,j}$	NOISE 	$\begin{array}{c} \beta_i \\ 0.2447 \\ 0.2393 \\ 0.2733 \\ 0.2144 \\ 0.2532 \\ 0.2735 \\ 0.2379 \\ 0.2656 \\ 0.2315 \\ 0.2735 \\ 0.2334 \\ 0.2689 \\ 0.2384 \\ 0.2689 \\ 0.2384 \\ 0.2689 \\ 0.2177 \\ 0.2427 \\ 0.2187 \\ 0.2113 \\ 0.2177 \\ 0.2427 \\ 0.2133 \\ 0.2174 \\ 0.2254 \\ 0.2303 \\ 0.2165 \\ 0.2661 \\$	$\begin{array}{c} h_{i,i} \\ 0.1379 \\ 0.1361 \\ 0.1465 \\ 0.1249 \\ 0.1404 \\ 0.1521 \\ 0.1375 \\ 0.1454 \\ 0.1322 \\ 0.149 \\ 0.1213 \\ 0.1289 \\ 0.1318 \\ 0.1362 \\ 0.1264 \\ 0.1264 \\ 0.1264 \\ 0.1234 \\ 0.1323 \\ 0.1284 \\ 0.1323 \\ 0.1284 \\ 0.1282 \\ 0.1284 \\ 0.1282 \\ 0.1265 \\ 0.126$	$\begin{array}{c} \alpha_i \\ 0.4872 \\ 0.4755 \\ 0.4706 \\ 0.3966 \\ 0.6607 \\ 0.7509 \\ 0.5943 \\ 0.4706 \\ 0.6315 \\ 0.4383 \\ 0.5234 \\ 0.4503 \\ 0.5234 \\ 0.4503 \\ 0.5234 \\ 0.5228 \\ 0.5719 \\ 0.5458 \\ 0.5228 \\ 0.5719 \\ 0.5165 \\ 0.5468 \\ 0.5896 \\ 0.5220 \\ 0.5127 \\ 0.5327 \\$	$\begin{array}{c} 0.3167\\ -\\ -\\ -\\ 0.3441\\ 0.3196\\ 0.3749\\ 0.3199\\ 0.2868\\ 0.3017\\ 0.3033\\ 0.3215\\ 0.3347\\ 0.3639\\ 0.326\\ 0.3902\\ -\\ -\\ 0.5373\\ 0.2921\\ 0.35501\\ 0.3221\\ 0.35500\\ 0.3221\\ 0.35500\\ 0.3251\\ 0.2607\\ 0.375$	$\begin{array}{c} 20\% \ {\rm f} \\ g_{i,j} \\ - \\ - \\ - \\ 0.2871 \\ 0.1906 \\ 0.1282 \\ - \\ 0.1967 \\ - \\ - \\ 0.2062 \\ - \\ - \\ 0.2435 \\ - \\ - \\ 0.2435 \\ - \\ - \\ 0.2520 \\ - \\ - \\ 0.2520 \\ - \\ - \\ - \\ 0.2520 \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ $	NOISE	$\begin{array}{c} \beta_i \\ 0.7432 \\ 0.7173 \\ 0.6231 \\ 0.6231 \\ 0.6231 \\ 0.6394 \\ 0.6570 \\ 0.6570 \\ 0.6570 \\ 0.6570 \\ 0.6529 \\ 0.6785 \\ 0.6200 \\ 0.6529 \\ 0.7717 \\ 0.7659 \\ 0.7717 \\ 0.7659 \\ 0.6765 \\ 0.6678 \\ 0.6678 \\ 0.6678 \\ 0.6678 \\ 0.6678 \\ 0.6678 \\ 0.6678 \\ 0.6678 \\ 0.6742 \\ 0.77427 \\ 0.77427 \\ 0.7727$	$\begin{array}{c} h_{i,i} \\ 0.3469 \\ 0.3481 \\ 0.3417 \\ 0.3100 \\ 0.3292 \\ 0.3463 \\ 0.3402 \\ 0.3236 \\ 0.3221 \\ 0.3236 \\ 0.3221 \\ 0.3314 \\ 0.3314 \\ 0.3316 \\ 0.3316 \\ 0.3358 \\ 0.35$
$\begin{array}{c} \mathbf{i} \\ 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \\ 7 \\ 8 \\ 9 \\ 10 \\ 11 \\ 12 \\ 13 \\ 14 \\ 15 \\ 16 \\ 17 \\ 18 \\ 19 \\ 20 \\ 21 \\ 22 \\ 23 \\ 24 \\ 25 \\ 26 \end{array}$	$\begin{array}{c} \alpha_i \\ \alpha_i \\ 0.1704 \\ 0.1636 \\ 0.1904 \\ 0.1393 \\ 0.2453 \\ 0.2582 \\ 0.2582 \\ 0.2203 \\ 0.1551 \\ 0.1663 \\ 0.2425 \\ 0.2203 \\ 0.1551 \\ 0.1676 \\ 0.2942 \\ 0.1874 \\ 0.1691 \\ 0.1851 \\ 0.1453 \\ 0.1811 \\ 0.1852 \\ 0.1875 \\ 0.1875 \\ 0.1899 \\ 0.1442 \\ 0.1875 \\ 0.1875 \\ 0.1790 \\ 0.1422 \\ 0.1875 \\ 0.1790 \\ 0.1422 \\ 0.1875 \\ 0.1790 \\ 0.1422 \\ 0.1875 \\ 0.1790 \\ 0.1422 \\ 0.1875 \\ 0.1790 \\ 0.1422 \\ 0.1875 \\ 0.1790 \\ 0.1422 \\ 0.1875 \\ 0.1790 \\ 0.1422 \\ 0.1875 \\ 0.1790 \\ 0.1422 \\ 0.1422 \\ 0.1422 \\ 0.1422 \\ 0.1422 \\ 0.1422 \\ 0.1424 \\ 0.1444 \\ 0.1444 \\ 0.1444 \\ 0.$	$\begin{array}{c} 0.0845\\ -\\ -\\ -\\ 0.1363\\ 0.0994\\ 0.1527\\ 0.1314\\ 0.2099\\ 0.1326\\ 0.1326\\ 0.1326\\ 0.1326\\ 0.1335\\ 0.1343\\ 0.1375\\ -\\ -\\ 0.1894\\ 0.1172\\ 0.1342\\ 0.1365\\ 0.12165\\ 0.12165\\ 0.12167\\ 0.145\\ 0.0945\end{array}$	10% 1 $g_{i,j}$	NOISE 	$\begin{array}{c} \beta_i \\ 0.2447 \\ 0.2393 \\ 0.2673 \\ 0.2144 \\ 0.2532 \\ 0.2753 \\ 0.2379 \\ 0.2655 \\ 0.2316 \\ 0.2316 \\ 0.2384 \\ 0.2569 \\ 0.2384 \\ 0.2569 \\ 0.2177 \\ 0.2427 \\ 0.21257 \\ 0.2427 \\ 0.2147 \\ 0.2427 \\ 0.2145 \\ 0.2105 \\ 0.2105 \\ 0.2157 \\ 0.2651 \\ 0.2651 \\ 0.2157 \\ 0.2651 \\ 0.2651 \\ 0.2551 $	$\begin{array}{c} h_{i,i} \\ 0.1379 \\ 0.1361 \\ 0.1465 \\ 0.1249 \\ 0.1404 \\ 0.1521 \\ 0.1404 \\ 0.1521 \\ 0.1454 \\ 0.1375 \\ 0.1454 \\ 0.1375 \\ 0.1454 \\ 0.1213 \\ 0.1280 \\ 0.138 \\ 0.138 \\ 0.138 \\ 0.138 \\ 0.138 \\ 0.1362 \\ 0.1269 \\ 0.1362 \\ 0.1261 \\ 0.1234 \\ 0.1284 \\ 0.1282 \\ 0.152 \\ 0.1252 \\ 0.1265 \\ 0.119 \end{array}$	$\begin{array}{c} \alpha_i \\ 0.4872 \\ 0.4755 \\ 0.4706 \\ 0.3966 \\ 0.6607 \\ 0.7509 \\ 0.5943 \\ 0.4706 \\ 0.6315 \\ 0.4383 \\ 0.5234 \\ 0.4719 \\ 0.6829 \\ 0.5458 \\ 0.5228 \\ 0.5719 \\ 0.5165 \\ 0.5468 \\ 0.5228 \\ 0.5719 \\ 0.5165 \\ 0.5266 \\ 0.5200 \\ 0.5223 \\ 0.5127 \\ 0.5327 \\ 0.5867 \\ 0.5064 \end{array}$	0.3167 - - 0.3350 0.3441 0.3196 0.3749 0.3841 0.3196 0.3749 0.3933 0.3215 0.3933 0.3215 0.3902 - 0.3902 - 0.3629 0.3902 - 0.3573 0.39240 0.3521 0.3551 0.3551 0.3551 0.3551 0.3551 0.3551 0.3759 0.3037 0.3055 0.3055 0.3759 0.3055 0.3055 0.3055 0.3759 0.3055 0.3055 0.3055 0.3759 0.3055 0.3055 0.3055 0.3555	$\begin{array}{c} 20\% \ 1\\ g_{i,j} \\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -$	NOISE	$\begin{array}{c} \beta_i \\ 0.7432 \\ 0.7173 \\ 0.7180 \\ 0.6231 \\ 0.6479 \\ 0.7515 \\ 0.7515 \\ 0.7148 \\ 0.6570 \\ 0.6394 \\ 0.6512 \\ 0.6829 \\ 0.6785 \\ 0.6209 \\ 0.6785 \\ 0.6209 \\ 0.6787 \\ 0.7128 \\ 0.7717 \\ 0.7728 \\ 0.7044 \\ 0.6678 \\ 0.6581 \\ 0.7542 \\ 0.7427 \\ 0.7729 \\ 0.7428 \\ 0.7427 \\ 0.7729 \\ 0.7468 \\ 0.7488 \\ 0.7488 \\ 0.7488 \\ 0.7488 \\ 0.7488 \\ 0.7729 \\ 0.7729 \\ 0.7729 \\ 0.7688 \\ 0.7488 \\ 0.7688 \\ 0.7688 \\ 0.7688 \\ 0.7688 \\ 0.7688 \\ 0.7688 \\ 0.7688 \\ 0.7688 \\ 0.7688 \\ 0.7688 \\ 0.7688 \\ 0.7688 \\ 0.7688 \\ 0.7688 \\ 0.7688 \\ 0.7729 \\ 0.7729 \\ 0.7729 \\ 0.7729 \\ 0.7688 \\$	$\begin{array}{c} h_{i,i} \\ 0.3469 \\ 0.3381 \\ 0.3417 \\ 0.3100 \\ 0.3292 \\ 0.3463 \\ 0.3402 \\ 0.3402 \\ 0.3199 \\ 0.3226 \\ 0.3221 \\ 0.3313 \\ 0.3314 \\ 0.3166 \\ 0.3314 \\ 0.3166 \\ 0.3358 \\ 0.3556 \\ 0.3358 \\ 0.3556 \\ 0.3358 \\ 0.3556 \\ 0.3336 \\ 0.3556 \\ 0.3336 \\ 0.3556 \\ 0.3336 \\ 0.3556 \\ 0.3336 \\ 0.3556 \\ 0.3358 \\ 0.3556 \\ 0.3358 \\ 0.3556 \\ 0.3358 \\ 0.3556 \\ 0.3368 \\ 0.3486 \\ 0.3498 \\ 0.3458 \\ 0.3$
$\begin{array}{c} \mathbf{i} \\ \mathbf{i} \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \\ 7 \\ 8 \\ 9 \\ 9 \\ 10 \\ 11 \\ 12 \\ 13 \\ 14 \\ 15 \\ 16 \\ 17 \\ 18 \\ 19 \\ 20 \\ 21 \\ 22 \\ 23 \\ 24 \\ 25 \\ 26 \\ 27 \end{array}$	$\begin{array}{c} \alpha_i \\ \alpha_i \\ 0.1704 \\ 0.1636 \\ 0.1904 \\ 0.1393 \\ 0.2453 \\ 0.2582 \\ 0.1815 \\ 0.2255 \\ 0.2205 \\ 0.2253 \\ 0.1551 \\ 0.1676 \\ 0.2452 \\ 0.2452 \\ 0.2452 \\ 0.1874 \\ 0.2452 \\ 0.1811 \\ 0.1881 \\ 0.1496 \\ 0.1453 \\ 0.1496 \\ 0.1453 \\ 0.1496 \\ 0.1453 \\ 0.1811 \\ 0.1832 \\ 0.1811 \\ 0.1832 \\ 0.1842 \\ 0.1875 \\ 0.1424 \\ 0.184 \\ 0$	$\begin{array}{c} 0.0845 \\ - \\ - \\ 0.1349 \\ 0.1363 \\ 0.0994 \\ 0.1527 \\ 0.1314 \\ 0.2099 \\ 0.1006 \\ 0.1326 \\ 0.1332 \\ 0.1331 \\ 0.1535 \\ 0.1331 \\ 0.1343 \\ 0.1375 \\ - \\ 0.1894 \\ 0.1172 \\ 0.1342 \\ 0.1564 \\ 0.1216 \\ 0.1216 \\ 0.1167 \\ 0.1216 \\ 0.1216 \\ 0.1216 \\ 0.1216 \\ 0.1216 \\ 0.1216 \\ 0.124 \\ 0.1945 \\ 0.0345 \\ 0.0$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	NOISE 	$\begin{array}{c} \beta_i \\ 0.2447 \\ 0.2393 \\ 0.2673 \\ 0.2144 \\ 0.2532 \\ 0.2753 \\ 0.2379 \\ 0.2656 \\ 0.2315 \\ 0.2053 \\ 0.2346 \\ 0.2534 \\ 0.2534 \\ 0.2384 \\ 0.2384 \\ 0.2384 \\ 0.2384 \\ 0.2384 \\ 0.2177 \\ 0.2427 \\ 0.2113 \\ 0.2113 \\ 0.2165 \\ 0.2113 \\ 0.2165 \\ 0.2165 \\ 0.2061 \\ 0.2165 \\ 0.2063 \\ 0.2063 \\ 0.2663 \\$	$\begin{array}{c} h_{i,i} \\ 0.1379 \\ 0.1361 \\ 0.1465 \\ 0.1249 \\ 0.1404 \\ 0.1521 \\ 0.1375 \\ 0.1404 \\ 0.1521 \\ 0.1375 \\ 0.1454 \\ 0.1322 \\ 0.149 \\ 0.1213 \\ 0.1289 \\ 0.138 \\ 0.1331 \\ 0.1462 \\ 0.1264 \\ 0.1264 \\ 0.1226 \\ 0.1284 \\ 0.152 \\ 0.1284 \\ 0.1284 \\ 0.1282 \\ 0.152 \\ 0.1265 \\ 0.119 \\ 0.142 \end{array}$	$\begin{array}{c} \alpha_i \\ \alpha_i \\ 0.4872 \\ 0.4755 \\ 0.4706 \\ 0.3966 \\ 0.6607 \\ 0.7509 \\ 0.5943 \\ 0.4706 \\ 0.6315 \\ 0.4383 \\ 0.5234 \\ 0.4503 \\ 0.5234 \\ 0.4503 \\ 0.5224 \\ 0.5719 \\ 0.5458 \\ 0.5719 \\ 0.5468 \\ 0.5228 \\ 0.5719 \\ 0.5165 \\ 0.5468 \\ 0.5228 \\ 0.5719 \\ 0.5165 \\ 0.5468 \\ 0.5228 \\ 0.5127 \\ 0.5867 \\ 0.$	$\begin{array}{c} & 0.3167 \\ & - \\ & - \\ & 0.350 \\ & 0.3441 \\ & 0.3196 \\ & 0.3749 \\ & 0.3199 \\ & 0.3817 \\ & 0.3017 \\ & 0.3933 \\ & 0.3017 \\ & 0.3347 \\ & 0.3626 \\ & 0.3902 \\ & - \\ & 0.5733 \\ & 0.3626 \\ & 0.3921 \\ & 0.3551 \\ & 0.2940 \\ & 0.3551 \\ & 0.3551 \\ & 0.3607 \\ & 0.3759 \\ & 0.3087 \\ & 0.3227 \\ & 0.3227 \\ & 0.3759 \\ & 0.3087 \\ & 0.3226 \\ & 0.3227 \\ & 0.3226 \\ & 0.3227 \\ & 0.3226 \\ & 0.3227 \\ & 0.3226 \\ & 0.3227 \\ & 0.327 \\ & 0.3$	20% f $g_{i,j}$	NOISE	$\begin{array}{c} \beta_i \\ 0.7432 \\ 0.7173 \\ 0.6231 \\ 0.6231 \\ 0.62479 \\ 0.7515 \\ 0.7148 \\ 0.6512 \\ 0.6394 \\ 0.6512 \\ 0.6394 \\ 0.6529 \\ 0.6785 \\ 0.6200 \\ 0.6529 \\ 0.7879 \\ 0.7717 \\ 0.7659 \\ 0.6737 \\ 0.7128 \\ 0.6737 \\ 0.7128 \\ 0.6678 \\ 0.6678 \\ 0.6678 \\ 0.7542 \\ 0.77427 \\ 0.77427 \\ 0.77427 \\ 0.77427 \\ 0.77427 \\ 0.77427 \\ 0.77427 \\ 0.77427 \\ 0.77465 \\ 0.6306 \\ 0.6306 \\ 0.7542 \\ 0.77427 \\ 0.77465 \\ 0.6306 \\ 0.6306 \\ 0.7542 \\ 0.77427 \\ 0.77465 \\ 0.6306 \\ 0.77427 \\ 0.77465 \\ 0.6306 \\ 0.77427 \\ 0.77465 \\ 0.6306 \\ 0.77427 \\ 0.77465 \\ 0.6306 \\ 0.77427 \\ 0.77465 \\ 0.6306 \\ 0.77427 \\ 0.77465 \\ 0.7740 \\ 0.77465 \\ 0.6306 \\ 0.7740 \\ 0$	$\begin{array}{c} h_{i,i} \\ 0.3469 \\ 0.3381 \\ 0.3417 \\ 0.3100 \\ 0.3292 \\ 0.3463 \\ 0.3423 \\ 0.3402 \\ 0.3236 \\ 0.3221 \\ 0.3314 \\ 0.3314 \\ 0.3314 \\ 0.3316 \\ 0.3202 \\ 0.3556 \\ 0.3556 \\ 0.3556 \\ 0.3556 \\ 0.3556 \\ 0.3556 \\ 0.3556 \\ 0.3556 \\ 0.3556 \\ 0.3368 \\ 0.3358 \\ 0.3358 \\ 0.3358 \\ 0.3498 \\ 0.3445 \\ 0.3455 \\ 0.3251 \\ 0.3466 \\ 0.3498 \\ 0.3455 \\ 0.3551 \\ 0.3455 \\ 0.3551 \\ 0.3455 \\ 0.3551 \\ 0.3455 \\ 0.3551 \\ 0.3455 \\ 0.3551 \\ 0.3455 \\ 0.3455 \\ 0.3551 \\ 0.3455 \\ 0.3455 \\ 0.3551 \\ 0.3455 \\ 0.3551 \\ 0.3455 \\ 0.3551 \\ 0.3455 \\ 0.3551 \\ 0.3455 \\ 0.3455 \\ 0.3455 \\ 0.3551 \\ 0.35$
$\begin{array}{c} \mathbf{i} \\ 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \\ 7 \\ 8 \\ 9 \\ 10 \\ 11 \\ 12 \\ 13 \\ 14 \\ 15 \\ 16 \\ 17 \\ 18 \\ 19 \\ 20 \\ 21 \\ 22 \\ 23 \\ 24 \\ 25 \\ 26 \\ 27 \\ 8 \end{array}$	$\begin{array}{c} \alpha_i \\ \alpha_i \\ 0.1704 \\ 0.1636 \\ 0.1904 \\ 0.1393 \\ 0.2453 \\ 0.2582 \\ 0.1815 \\ 0.2682 \\ 0.2203 \\ 0.2203 \\ 0.1551 \\ 0.1676 \\ 0.2042 \\ 0.1874 \\ 0.2452 \\ 0.1874 \\ 0.1463 \\ 0.1453 \\ 0.1445 \\ 0.1453 \\ 0.18811 \\ 0.1495 \\ 0.1425 \\ 0.1881 \\ 0.1881 \\ 0.1881 \\ 0.1495 \\ 0.1425 \\ 0.1875 \\ 0.1709 \\ 0.1424 \\ 0.2094 \\ 0.1875 \\ 0.1709 \\ 0.1424 \\ 0.2094 \\ 0.1805 \\ 0$	$\begin{array}{c} & & & & & & & & & & & & & & & & & & &$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	NOISE 	$\begin{array}{c} \beta_i \\ 0.2447 \\ 0.2393 \\ 0.2673 \\ 0.2144 \\ 0.2532 \\ 0.2753 \\ 0.2379 \\ 0.2655 \\ 0.2735 \\ 0.2336 \\ 0.2346 \\ 0.2384 \\ 0.2569 \\ 0.2384 \\ 0.2569 \\ 0.2384 \\ 0.2427 \\ 0.2177 \\ 0.2427 \\ 0.2113 \\ 0.21147 \\ 0.2113 \\ 0.21147 \\ 0.2157 \\ 0.2254 \\ 0.2303 \\ 0.21601 \\ 0.2157 \\ 0.2264 \\ 0.2303 \\ 0.2468 \\ 0.2061 \\ 0.2167 \\ 0.2063 \\ 0.2468 \\ 0.246$	$\begin{array}{c} h_{i,i} \\ 0.1379 \\ 0.1361 \\ 0.1465 \\ 0.1249 \\ 0.1404 \\ 0.1521 \\ 0.1375 \\ 0.1454 \\ 0.1375 \\ 0.1454 \\ 0.1322 \\ 0.1454 \\ 0.1320 \\ 0.1289 \\ 0.138 \\ 0.1381 \\ 0.1462 \\ 0.1269 \\ 0.1362 \\ 0.1269 \\ 0.1362 \\ 0.1261 \\ 0.1284 \\ 0.1323 \\ 0.1284 \\ 0.1284 \\ 0.1282 \\ 0.152 \\ 0.152 \\ 0.1428 \\ 0.1428 \\ 0.152 \\ 0.142 \\ 0.152 \\ 0.142 \\ 0.137 \\ 0.142 \\ 0$	$\begin{array}{c} \alpha_i \\ 0.4872 \\ 0.4755 \\ 0.4706 \\ 0.3966 \\ 0.6607 \\ 0.7509 \\ 0.5943 \\ 0.4706 \\ 0.6315 \\ 0.4383 \\ 0.4706 \\ 0.6315 \\ 0.4383 \\ 0.4719 \\ 0.6829 \\ 0.5458 \\ 0.5228 \\ 0.5719 \\ 0.5165 \\ 0.5468 \\ 0.5228 \\ 0.5223 \\ 0.5127 \\ 0.5327 \\ 0.5367 \\ 0.5064 \\ 0.5359 \\ 0.5359 \\ 0.5280 \\ 0.5223 \\ 0.5127 \\ 0.5064 \\ 0.5359 \\ 0.5359 \\ 0.5280 \\ 0.5280 \\ 0.5280 \\ 0.5280 \\ 0.5359 \\$	0.3167 	$\begin{array}{c} 20\% \ {\rm f} \\ g_{i,j} \\ - \\ - \\ - \\ 0.2871 \\ 0.1906 \\ 0.1282 \\ - \\ 0.1282 \\ - \\ 0.1282 \\ - \\ 0.1282 \\ - \\ 0.2062 \\ - \\ - \\ 0.2062 \\ - \\ - \\ 0.20520 \\ - \\ 0.2520 \\ - \\ 0.2520 \\ - \\ 0.2520 \\ - \\ 0.2626 \\ - \\ 0.2626 \\ - \\ - \\ 0.2626 \\ - \\ - \\ - \\ 0.2626 \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ $	NOISE 	$\begin{array}{c} \beta_i \\ 0.7432 \\ 0.7432 \\ 0.7173 \\ 0.6231 \\ 0.6231 \\ 0.6479 \\ 0.7515 \\ 0.7148 \\ 0.6570 \\ 0.6394 \\ 0.6512 \\ 0.6394 \\ 0.6394 \\ 0.6529 \\ 0.6737 \\ 0.7128 \\ 0.77128 \\ 0.77128 \\ 0.77128 \\ 0.7659 \\ 0.7644 \\ 0.7659 \\ 0.7644 \\ 0.7642 \\ 0.7659 \\ 0.7644 \\ 0.7642 \\ 0.7643 \\ 0.7542 \\ 0.7465 \\ 0.6678 \\ 0.6678 \\ 0.6678 \\ 0.6678 \\ 0.7542 \\ 0.7427 \\ 0.7729 \\ 0.7465 \\ 0.6391 \\ 0.7016 \\ 0.701$	$\begin{array}{c} h_{i,i} \\ 0.3469 \\ 0.3381 \\ 0.3417 \\ 0.3100 \\ 0.3292 \\ 0.3463 \\ 0.3402 \\ 0.3221 \\ 0.3236 \\ 0.3221 \\ 0.3313 \\ 0.3314 \\ 0.3164 \\ 0.3202 \\ 0.3619 \\ 0.3256 \\ 0.3358 \\ 0.3556 \\ 0.3358 \\ 0.3556 \\ 0.3358 \\ 0.3556 \\ 0.3330 \\ 0.3566 \\ 0.3330 \\ 0.3566 \\ 0.3330 \\ 0.3566 \\ 0.3345 \\ 0.3252 \\ 0.3181 \\ 0.3466 \\ 0.3498 \\ 0.3466 \\ 0.3498 \\ 0.3254 \\ 0.3254 \\ 0.3254 \\ 0.3254 \\ 0.3254 \\ 0.3254 \\ 0.3254 \\ 0.3254 \\ 0.3254 \\ 0.3264 \\ 0.3498 \\ 0.3254 \\ 0.3254 \\ 0.3254 \\ 0.3254 \\ 0.3264 \\ 0.3498 \\ 0.3254 \\ 0.3264 \\ 0.3498 \\ 0.3254 \\ 0.3254 \\ 0.3264 \\ 0.3466 \\ 0.3498 \\ 0.3254 \\ 0.3$
$\begin{array}{c} \mathbf{i} \\ \mathbf{i} \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \\ 7 \\ 8 \\ 9 \\ 9 \\ 10 \\ 11 \\ 12 \\ 13 \\ 14 \\ 15 \\ 16 \\ 17 \\ 18 \\ 19 \\ 20 \\ 21 \\ 22 \\ 23 \\ 24 \\ 25 \\ 26 \\ 27 \\ 28 \\ 27 \\ 28 \\ 29 \\ 29 \end{array}$	$\begin{array}{c} \alpha_i \\ \alpha_i \\ 0.1704 \\ 0.1636 \\ 0.1904 \\ 0.1393 \\ 0.2453 \\ 0.2582 \\ 0.1815 \\ 0.2325 \\ 0.2235 \\ 0.2235 \\ 0.2235 \\ 0.1551 \\ 0.1676 \\ 0.2325 \\ 0.2204 \\ 0.2452 \\ 0.2452 \\ 0.2452 \\ 0.2452 \\ 0.2452 \\ 0.1661 \\ 0.1451 \\ 0.1481 \\ 0.1481 \\ 0.1481 \\ 0.1481 \\ 0.1481 \\ 0.1481 \\ 0.1481 \\ 0.1481 \\ 0.1423 \\ 0.1709 \\ 0.1442 \\ 0.1879 \\ 0.1424 \\ 0.2094 \\ 0.1893 \\ 0.709 \\ 0.1799 \\ 0.1799 \\ 0.1242 \\ 0.2094 \\ 0.1893 \\ 0.2094 \\ 0.1893 \\ 0.1799 \\ 0.1293 \\ 0.1799 \\ 0.1$	$\begin{array}{c} 0.0845 \\ - \\ - \\ 0.1363 \\ 0.0994 \\ 0.1527 \\ 0.1314 \\ 0.2099 \\ 0.1006 \\ 0.1326 \\ 0.10326 \\ 0.13391 \\ 0.13391 \\ 0.1342 \\ 0.1343 \\ 0.1375 \\ - \\ 0.1842 \\ 0.1342 \\ 0.1172 \\ 0.1342 \\ 0.1216 \\ 0.1165 \\ 0.1216 \\ 0.1165 \\ 0.1216 \\ 0.1165 \\ 0.1216 \\ 0.1145 \\ 0.0145 \\$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	NOISE 	$\begin{array}{c} \beta_i \\ 0.2447 \\ 0.2333 \\ 0.2673 \\ 0.2144 \\ 0.2532 \\ 0.2753 \\ 0.2379 \\ 0.2656 \\ 0.2315 \\ 0.2753 \\ 0.2346 \\ 0.2033 \\ 0.2346 \\ 0.2384 \\ 0.2384 \\ 0.2569 \\ 0.2177 \\ 0.2425 \\ 0.2113 \\ 0.2165 \\ 0.2165 \\ 0.2165 \\ 0.2165 \\ 0.2165 \\ 0.2063 \\ 0.2165 \\ 0.2063 \\ 0.2468 \\ 0.249$	$\begin{array}{c} h_{i,i} \\ 0.1379 \\ 0.1361 \\ 0.1465 \\ 0.1249 \\ 0.1404 \\ 0.1521 \\ 0.1375 \\ 0.1454 \\ 0.1375 \\ 0.1454 \\ 0.1322 \\ 0.149 \\ 0.1213 \\ 0.1289 \\ 0.1318 \\ 0.138 \\ 0.138 \\ 0.1362 \\ 0.1261 \\ 0.1261 \\ 0.1224 \\ 0.1306 \\ 0.1323 \\ 0.1284 \\ 0.152 \\ 0.152 \\ 0.1265 \\ 0.119 \\ 0.137 \\ 0.139 \\ \end{array}$	$\begin{array}{c} \alpha_i \\ \alpha_i \\ 0.4872 \\ 0.4755 \\ 0.4706 \\ 0.3966 \\ 0.6607 \\ 0.7509 \\ 0.5943 \\ 0.4706 \\ 0.6315 \\ 0.4383 \\ 0.4706 \\ 0.6315 \\ 0.4383 \\ 0.5234 \\ 0.4503 \\ 0.5234 \\ 0.5234 \\ 0.5234 \\ 0.5719 \\ 0.5468 \\ 0.5228 \\ 0.5719 \\ 0.5165 \\ 0.5468 \\ 0.5223 \\ 0.5127 \\ 0.5327 \\ 0.5327 \\ 0.5327 \\ 0.53667 \\ 0.5359 \\ 0.5280 \\ 0$	$\begin{array}{c} & & & \\$	$\begin{array}{c} 20\% \ {\rm f} \\ g_{i,j} \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ $	VOISE	$\begin{array}{c} \beta_i\\ 0.7432\\ 0.7173\\ 0.6231\\ 0.6231\\ 0.6479\\ 0.7515\\ 0.7148\\ 0.6570\\ 0.6394\\ 0.6512\\ 0.6829\\ 0.6785\\ 0.6829\\ 0.6785\\ 0.6200\\ 0.6529\\ 0.6785\\ 0.6200\\ 0.6529\\ 0.6737\\ 0.7127\\ 0.7659\\ 0.7717\\ 0.7659\\ 0.7717\\ 0.7659\\ 0.7717\\ 0.7642\\ 0.7747\\ 0.6678\\ 0.7712\\ 0.7427\\ 0.7427\\ 0.7729\\ 0.7465\\ 0.7715\\ 0.7015\\ 0.$	$\begin{array}{c} h_{i,i} \\ 0.3469 \\ 0.3381 \\ 0.3410 \\ 0.3100 \\ 0.3292 \\ 0.3463 \\ 0.3420 \\ 0.3236 \\ 0.3236 \\ 0.3236 \\ 0.3231 \\ 0.3314 \\ 0.3314 \\ 0.3316 \\ 0.3202 \\ 0.3556 \\ 0.3388 \\ 0.3455 \\ 0.3254 \\ 0.3398 \\ 0.3254 \\ 0.3398 \\ 0.358 \\ 0.358 \\ 0.358 \\ 0.358 \\ 0.358 \\ 0.358 \\ 0.358 \\ 0.358 \\ 0.3398 \\ 0.338 \\$
$\begin{array}{c} {\rm i}\\ {\rm i}\\ 1\\ 2\\ 3\\ 4\\ 5\\ 6\\ 7\\ 8\\ 9\\ 9\\ 10\\ 11\\ 12\\ 13\\ 14\\ 15\\ 16\\ 17\\ 8\\ 19\\ 20\\ 21\\ 22\\ 23\\ 24\\ 25\\ 26\\ 27\\ 28\\ 29\\ 90\\ 30\\ \end{array}$	$\begin{array}{c} \alpha_i \\ \alpha_i \\ 0.1704 \\ 0.1636 \\ 0.1904 \\ 0.1393 \\ 0.2453 \\ 0.2582 \\ 0.1815 \\ 0.2252 \\ 0.2223 \\ 0.1963 \\ 0.2325 \\ 0.2203 \\ 0.1551 \\ 0.1676 \\ 0.2024 \\ 0.2452 \\ 0.1874 \\ 0.2452 \\ 0.1874 \\ 0.14851 \\ 0.1496 \\ 0.1453 \\ 0.1481 \\ 0.14851 \\ 0.1495 \\ 0.1424 \\ 0.1875 \\ 0.1726 \\ 0.1424 \\ 0.2994 \\ 0.1924 \\ 0.1926 \\ $	$\begin{array}{c} 0.0845 \\ - \\ - \\ 0.1363 \\ 0.0994 \\ 0.1527 \\ 0.1314 \\ 0.2099 \\ 0.1525 \\ 0.1314 \\ 0.2099 \\ 0.1535 \\ 0.1326 \\ 0.1535 \\ 0.1331 \\ 0.1555 \\ 0.1341 \\ 0.1549 \\ 0.1549 \\ 0.1549 \\ 0.1549 \\ 0.1549 \\ 0.1549 \\ 0.1549 \\ 0.1341 \\ 0.155 \\ 0.0945 \\ 0.0945 \\ 0.1381 \\ 0.157 \\ 0.1405 \\ 0.1279 \\ 0.1405 \\ 0.1405 \\ 0.1279 \\ 0.1405 \\$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	NOISE 	$\begin{array}{c} \beta_i \\ 0.2447 \\ 0.2393 \\ 0.2735 \\ 0.2144 \\ 0.2532 \\ 0.2735 \\ 0.2315 \\ 0.2315 \\ 0.2315 \\ 0.2315 \\ 0.2315 \\ 0.2346 \\ 0.2384 \\ 0.2569 \\ 0.2384 \\ 0.2569 \\ 0.2384 \\ 0.2569 \\ 0.2177 \\ 0.2427 \\ 0.2427 \\ 0.2147 \\ 0.2147 \\ 0.2147 \\ 0.2145 \\ 0.2105 \\ 0.2113 \\ 0.2147 \\ 0.2266 \\ 0.2113 \\ 0.2147 \\ 0.2266 \\ 0.2105 \\$	$\begin{array}{c} h_{i,i} \\ 0.1379 \\ 0.1361 \\ 0.1465 \\ 0.1249 \\ 0.1404 \\ 0.1521 \\ 0.1375 \\ 0.1454 \\ 0.1322 \\ 0.149 \\ 0.1213 \\ 0.1289 \\ 0.1318 \\ 0.1361 \\ 0.1269 \\ 0.1362 \\ 0.1261 \\ 0.1264 \\ 0.1323 \\ 0.1284 \\ 0.131 \\ 0.139 \\ 0.141 \\ 0.137 \\ 0.139 \\ 0.141 \\ 0.137 \\ 0.139 \\ 0.141 \\ 0.137 \\ 0.139 \\ 0.141 \\ 0.137 \\ 0.139 \\ 0.141 \\ 0.137 \\ 0.139 \\ 0.141 \\ 0.137 \\ 0.139 \\ 0.141 \\ 0.137 \\ 0.139 \\ 0.141 \\ 0.137 \\ 0.137 \\ 0.141 \\ 0.137 \\ 0.137 \\ 0.141 $	$\begin{array}{c} \alpha_i \\ 0.4872 \\ 0.4755 \\ 0.4706 \\ 0.3966 \\ 0.6607 \\ 0.7509 \\ 0.5943 \\ 0.4706 \\ 0.6315 \\ 0.4383 \\ 0.4706 \\ 0.6315 \\ 0.4383 \\ 0.4719 \\ 0.6829 \\ 0.5458 \\ 0.5228 \\ 0.5719 \\ 0.5165 \\ 0.5468 \\ 0.5896 \\ 0.5220 \\ 0.5127 \\ 0.5327 \\ 0.5367 \\ 0.5064 \\ 0.5359 \\ 0.5182 \\ 0.5182 \\ 0.5182 \\ 0.55867 \\ 0.5280 \\ 0.5280 \\ 0.5280 \\ 0.5280 \\ 0.5280 \\ 0.5280 \\ 0.5280 \\ 0.5280 \\ 0.5280 \\ 0.5182 \\ 0.5182 \\ 0.55867 \\ 0.5064 \\ 0.5359 \\ 0.5280 \\ 0.5280 \\ 0.5280 \\ 0.5280 \\ 0.5280 \\ 0.5280 \\ 0.5280 \\ 0.5182 \\ 0.55867 \\ 0.5182 \\ 0.5182 \\ 0.55867 \\ 0.5182 \\ 0.55867 \\ 0.5182 \\ 0.55867 \\ 0.5182 \\ 0.55867 \\ 0.55867 \\ 0.55867 \\ 0.55867 \\ 0.55867 \\ 0.55867 \\ 0.55867 \\ 0.5580 \\ 0.5582 \\ 0.5580 \\ 0.580 \\ 0.580 \\ 0.580 \\ 0.580 \\ 0.580 \\ 0.580 \\ 0.580 \\ 0.580 \\ 0.5$	$\begin{array}{c} & 0.3167 \\ & - \\ & - \\ & - \\ & 0.3441 \\ 0.3196 \\ 0.3491 \\ 0.3199 \\ 0.2868 \\ 0.3017 \\ 0.3933 \\ 0.3215 \\ 0.3017 \\ 0.3626 \\ 0.3902 \\ - \\ & - \\ 0.5373 \\ 0.2920 \\ 0.3551 \\ 0.2607 \\ 0.3251 \\ 0.2607 \\ 0.3757 \\ 0.3220 \\ 0.3363 \\ 0.3310 \\ 0.3361 \\ 0.3561 \\ $	$\begin{array}{c} 20\% \ {\rm f} \\ g_{i,j} \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ $	NOISE	$\begin{array}{c} \beta_i \\ 0.7432 \\ 0.7173 \\ 0.6231 \\ 0.6231 \\ 0.6231 \\ 0.6512 \\ 0.6594 \\ 0.6512 \\ 0.6394 \\ 0.6512 \\ 0.6785 \\ 0.6200 \\ 0.6785 \\ 0.6200 \\ 0.6787 \\ 0.7128 \\ 0.6787 \\ 0.7128 \\ 0.7717 \\ 0.7659 \\ 0.7044 \\ 0.6678 \\ 0.6678 \\ 0.6581 \\ 0.77427 \\ 0.7729 \\ 0.7427 \\ 0.7729 \\ 0.7427 \\ 0.7729 \\ 0.7427 \\ 0.7729 \\ 0.7427 \\ 0.7729 \\ 0.7427 \\ 0.7729 \\ 0.7427 \\ 0.7729 \\ 0.7054 \\ 0.7094 \\ 0.7004 $	$\begin{array}{c} h_{i,i} \\ 0.3469 \\ 0.3481 \\ 0.3417 \\ 0.3100 \\ 0.3292 \\ 0.3463 \\ 0.3402 \\ 0.3236 \\ 0.3221 \\ 0.3236 \\ 0.3221 \\ 0.3314 \\ 0.3314 \\ 0.3316 \\ 0.3302 \\ 0.3358 \\ 0.3348 \\ 0.3$

Table 1: Median relative error of the parameters for all noise levels. The  $g_{i,j}$  column is filled with the non-zero parameters appearing in the given equation. For instance, in line 8 (2% relative noise) the relative errors for parameters  $g_{8,4}$ ,  $g_{8,17}$  can be read in the  $g_{i,j}$  column: 0.1503 and 0.1372, respectively.

### 4 Pseudo code for the topology searching algorithm

We denote our algorithm as function ALG, whose input is the DATA and the network topology  $(\vec{N})$  and the output is the parameter estimates (**p**), the residuals  $(f(\mathbf{p}))$  and the  $R^2$  value obtained for the attractor fitting. In the following algorithm  $N_i$  denotes all the networks whose edges point to vertex *i*.

```
TOPOLOGY SEARCH ALGORITHM (INPUT : DATA, vertex i, OUTPUT : \vec{N}_{i^*}, p_{i^*})
FOR i=1 TO n
     \mathcal{N}^s = \mathcal{N}_i
     residual = \infty
     WHILE \mathcal{N}^s \neq \emptyset
         \mathcal{N}^* = \{ \overrightarrow{N} \in \mathcal{N}^s : \overrightarrow{N} \text{ is minimal in } \mathcal{N}^s \} = \{ \overrightarrow{N}_j : j = 1, \dots, J \}
         \mathcal{N}^s = \mathcal{N}^s \setminus \mathcal{N}^*
         FOR j = 1 TO J
              (p[j], res[j], R^2[j]) = ALG(DATA, \overrightarrow{N}_j)
              IF R^2[j]) < 0.9
                  res[j] = \infty
                  \mathcal{N}^s = \mathcal{N}^s \setminus \{ \overrightarrow{N} : \overrightarrow{N}_j \prec \overrightarrow{N} \}
              END
              j^* = \operatorname{argmin}_j res[j]
              IF res[j^*] < residual
                   fin[i] = p[j^*]
                   residual = res[j^*]
              END
          END
     END
END
```



Figure 1: Different behaviours of the 2-dimensional system (Eq.(1-4)) depending on the initial concentrations and  $\alpha_1$ .

### References

S Kimura, K Ide, A Kashihara, M Kano, M Hatakeyama, R Masui, N Nakagawa, S Yokoyama, S Kuramitsu, and A Konagaya. Inference of s-system models of genetic networks using a cooperative coevolutionary algorithm. *Bioinformatics*, 21:1154–1163, 2005.



Figure 2: Projections of the Newton candidates and the fitted attractor curve for the 4 different systems described in Eq.(1-4). (1)  $\alpha_1 = 3, x_1(0) = 1, x_2(0) = 1, (2) \alpha_1 = 1.5, x_1(0) = 1.5, x_2(0) = 1.5$  (3)  $\alpha_1 = 0.75, x_1(0) = 1, x_2(0) = 1, (4) \alpha_1 = 0.75, x_1(0) = 2, x_2(0) = 1.5$ 



Figure 3: Projections of the Newton candidates and the fitted attractor curves for the 4-dimensional example (Eq.(5)).



Figure 4: Projections of the Newton candidates and the fitted attractor curve for Eqs. (11), (24), (27) for the 30-dim example.



Figure 5: Projections of the Newton candidates and the fitted attractor curves for the algebraic equation (Eq.(6)).