

01AB773 Introduction to Sustainable Agriculture in Rural Areas**Feedback Quiz 5: Site-Specific Management and Decision Support Systems****Total Points 20**

Name:

ID:

1. Suppose an Alfalfa Yield model was described as (Hypothetical): $Y=0.34+(X1*2.24) +(X2*1.4) +(X3*0.24)$, where Y=Aalfalfa yield in tons/ha, X1 =Plants per square meter, X2 =Days of regrowth, and X3 = ppm of available potassium (Brase 2006, p:165). Given dummy values of X1, X2 and X3 for 30 pixels (ton/ha) and total yield of the 30 pixels (tons).

Pixel no.	X1 (plants)	X2 (days)	X3 (ppm)	Y (tons/ha)
1	5	34	25.62494	
2	8	30	21.65777	
3	5	30	22.4198	
4	6	23	20.59654	
5	9	23	22.38173	
6	9	26	14.06585	
7	9	19	22.46584	
8	7	23	17.6832	
9	12	22	23.62632	
10	6	23	25.01209	
11	7	32	28.26834	
12	6	32	20.52282	
13	14	27	20.00814	
14	13	27	23.58546	
15	6	23	22.07428	
16	6	23	22.16676	
17	2	24	29.3088	
18	3	26	23.15074	
19	8	27	22.41609	
20	8	23	30.32129	
21	8	21	20.47706	
22	11	28	28.08455	
23	10	33	22.93865	
24	6	28	22.74233	
25	3	26	29.44062	
26	8	30	24.45053	
27	1	28	24.74824	
28	3	24	22.0595	
29	9	24	25.73331	
30	12	40	22.72546	

Hint: pay attention to yield unit and pixel resolution

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2. Given field measured leaf area index (LAI ($\text{m}^2 \text{m}^{-2}$)) (i.e., ground truth) and corresponding dummy IKONOS NDVI sample training data, please generate a linear statistic model just fitted to estimate LAI per pixel within the IKONOS GIS database.

Sample ground truth

Sample no.	Field measured LAI ($\text{m}^2 \text{m}^{-2}$)	Corresponding IKONOS NDVI
1	3.9	0.81136
2	4.4	0.884396
3	2.5	0.606007
4	3.9	0.811136
5	4.7	0.928352
6	4.9	0.957656
7	2.8	0.649963
8	0.9	0.371575
9	1.3	0.430183
10	4.4	0.884396
11	4.6	0.9137
12	5	0.972308
13	4.3	0.869744
14	1.6	0.474139
15	3.6	0.767179
16	2.4	0.591355
17	2	0.532747
18	0.7	0.342271
19	0.7	0.342271
20	2.4	0.591355

Pixel no.	IKONOS NDVI	LAI ($\text{m}^2 \text{m}^{-2}$)
1	0.561476	
2	0.441913	
3	0.553054	
4	0.550202	
5	0.546469	
6	0.866731	
7	0.368445	
8	0.99897	
9	0.905095	
10	0.632571	
11	0.580639	
12	0.659678	
13	0.619392	
14	0.509988	
15	0.678871	
16	0.299051	
17	0.736898	
18	0.3376	
19	0.786757	
20	0.99991	
21	0.371057	
22	0.527784	
23	0.664495	
24	0.631409	
25	0.375737	
26	0.194962	
27	0.83786	
28	0.456194	
29	0.471417	
30	0.733992	

Please fit a linear model