Engin 103 March 12, 2009 back to e-syllabus	Topics: Project 1 -Part II Presentations Logbook questions

Project 1 Part II Presentations: Data Modeling and System Predictability Testing (Cont.)

Excerpt from Project 1 specifications (see link in e-syllabus): "In the second day, you will show the class the predictability of your system. The predictability will be checked as follows: you will be required to show a sufficient (at least 10) number of data (X,Y)'s you measured using your system, and the best model or equation Y'=f(X) you found with Excel in relating these data. Next you will be required to use this model to make a prediction Y' for some new value X, given by the audience, with your model. Next you will run your system for that input X, obtaining the actual output Y. Your system will be considered predictable if Y' and Y differ by less than 10%."

Project 1 leaders: please copy this document and fill in your team response below. Then save as a web page: name "p1p2.html" and upload to your *files* folder.

Team #	Snapshot of Spreadsheet showing best mathematical model for your system	a) Your best model" A=; B=; C=; D= b) What are the requested X= and predicted output Y'= along with their units	c) List the three values obtained Y_1=; Y_2=; Y_3=; d) List their average Y_{av} e) $\|Y'-Y_{av}\|/Y_{av}$ *100= %	f) Explain your thoughts on what design elements most influenced the predictability obtained g) Explain what can be done to further improve its predictability
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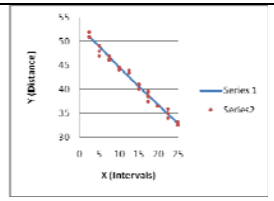
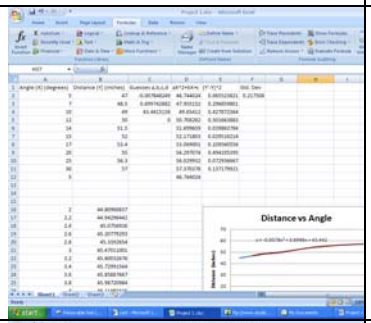
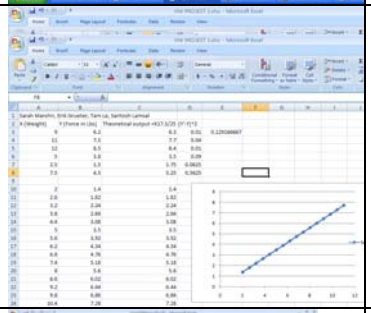
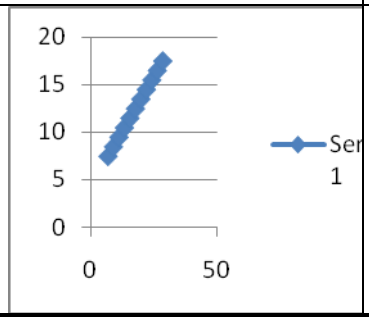
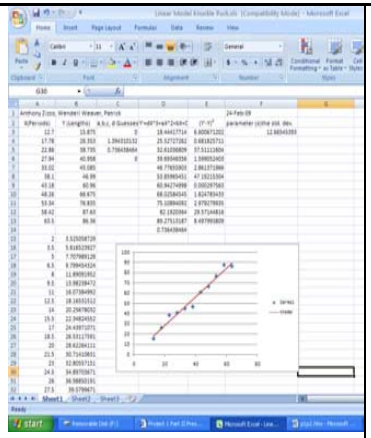
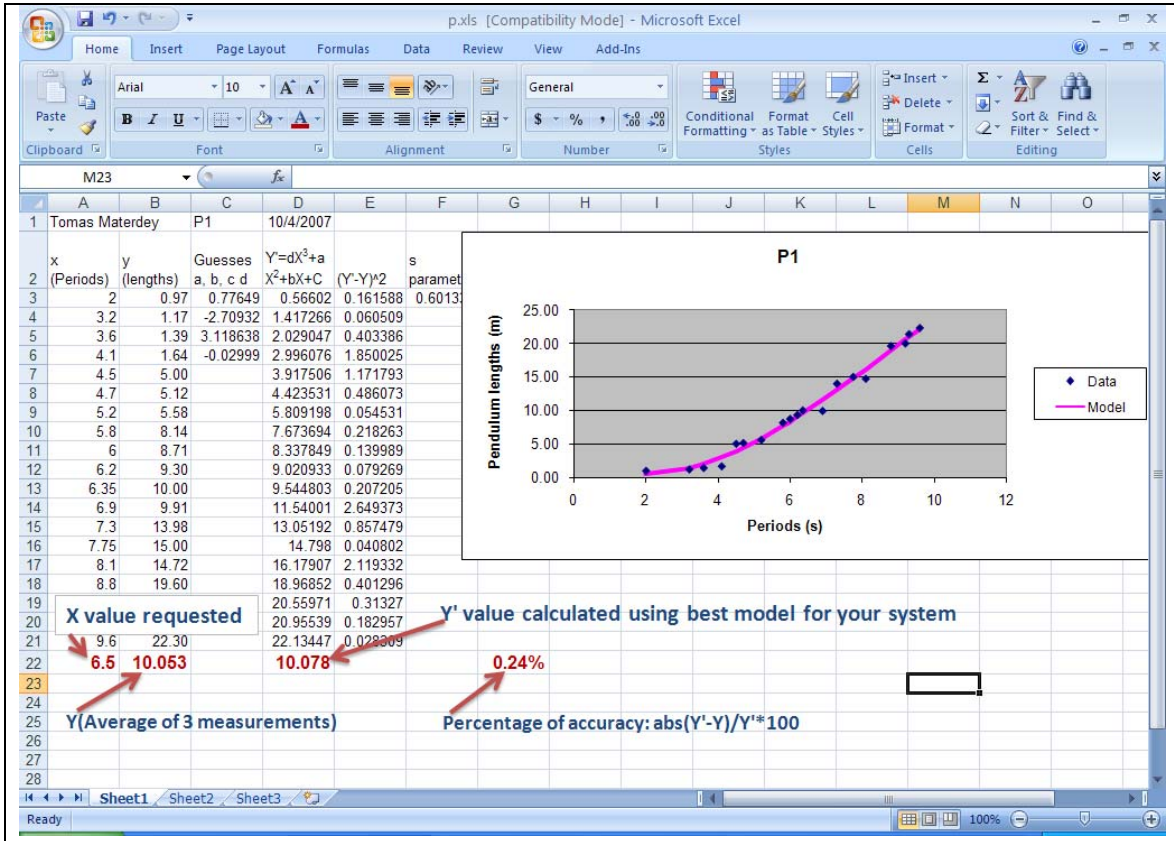
2				
3		A= 0.002522657 B= -0.871793578 C= 53.14676378 Our X values range between 2.5 to 25 with 2.5 intervals. Our Y' predicted out puts range from ~32 to ~52	When x = 2.5 Y1 = 51 Y2 = 52 Y3 = 52 Y ave = 51.666667	From our design we believe that the way the card is removed from the slot alters the balls speed by changing the way the ball spins within the pipe. Other then this there is no other human input until measurement. To improve predictability we would need to create a spring or motorized removal of

			% Error = ~ 1.34% |50.98304644 - 51.66666667| / 51.66666667 * 100 = 1.340877553	the card to create a constant motion for each X interval.
4		**A = -0.007848249** **B = 0.699742882** **C = 43.4415156** **D = 0** X = 5 degrees Y' = 46.74402379 inches	$Y_{1=}$ 45 in Y_2 = 49.3 in Y_3 = 54 in $Y_{average}$ = 49.4333333 in % Error = 5.4	The positioning of the spoon tightly to enable the full launch of the ball. We find a way to attach the spoon permanently to the brick to reduce the probability of error.
5		**A) Our best model is y=X17.5/25** **B= 0.7 C= 0** **B) The requested X =5 and the predicted output Y' = 3.5**	C)Y=3.2,Y=3.2Y=3.2 D) Ave=3.2 E) %= 9.375%	The design element that most influenced the predictability was the lengths of the effort and load arms. Using the equation y=x times the load arm/ effort arm we were able to determine the y output. G) To further improve the predictability we could have weighed the load arm before attaching it to the system and add it weight to the total weight lifted to calculate the force.
6		**A=0 B=0 C=0.0334** **D=0.691**	Y1=17.88 Y2=15.72 Y3=15.04 AVG 16.213 %error 12.5	We believe that since the sugar sat around it became stickier given the first reading. We should have done a day run first, to improve the condition of the sugar and break it up a little, so we get a more consistent set of readings. Like in the second and third trials.

7		a) Quadratic A= -0.00073 B= 1.319329 C= 32.39607 b) Requested X= 110mm Predicted Output= 168.79mm	c) Y_1=157 Y_2=153 Y_3=150 d) 153.3333 e) $Y'-Y_{av}/Y_{av}$ *100= 9.16%	f) The design element which had the most effect on our model's predictability is the disconnect between the various aspects of the model. Had the model been better connected, there would have been less opportunity for variation between tests. As it was, the various shifting and moving of parts could lead to statistical improbability and volatility what was seen on the output end of the system. g) Generally, were the model more exact in its specifications, it would be more likely to obtain a predictable result. Since it was difficult, at times, for precision to be achieved—either in the X input or the Y output—design elements which promote precision and accurate observation would lead to a more predictable model.
8		a)A= -3.59E-06 B=0.454 C=4.498 b) X=6.6 to 28.6 Y'=7.5 to17.5		f)The element that increased the predictability of our system was the angle at which we placed the ramp. By doing this, we would control the Y values that would come out, making it easier to predict g)The only thing that can be done to improve predictability is to have a constant height at which the putter is released. When we experimented, the height could have been off by maybe a mm.

9		a)A= 0 B= 1.394310132 C= 0.736438464 D= 0 b) requested X was 42 cm and output was 58 cm	c) Y1=42 Y2=62 Y3=69 d) average Y=51 e)445.2	f) The precision of the lays in its and ease of use. g) The best way to make the system more predictable is to make a landing strip, so as to keep friction forces constant
10				

Example spreadsheet:



According to Project 1 specifications (e-syllabus) the grading criteria are as follow:

Items	Points for both Part I and Part II
Project completed and presented	70
Project performance (predictability)	50
Good design (spreadsheet and data	30

modeling)	
Project presentation and webpage	50

Project 1 -part II/ Teams	1	2	3	4	5	6	7	8	9	10
Project completed (35)	35	35	35	35	35	35	35	35	35	35
Spreadsheet and data modeling (15)	15	15	15	15	15	15	15	15	15	15
System predictability (25)	23	21	23	21	23	21	21	24	18	22
Presentation (15)	15	15	15	15	15	15	15	15	15	15
Web page (10)										
Total part II (100)	88	86	88	86	88	86	86	89	83	87

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LOGBOOK: example of a logbook page

-Use a quadrille notebook; number all pages; date all entries
-Write your notes for all activities, thoughts, problems and solutions, and learning conclusions related to Engin 103. You should write down progress, outcomes, and conclusions on projects and teamwork; conclusions from class work (including LabVIEW) and homework.
-In addition you should answer in the logbook all questions listed in these notes in blue, as shown below:

No questions

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