Emis 8348 homework 1 part 1

EMIS 8348 Homework 1 — Part 1 Solutions Problem 1: Observations of the demand for a certain part stocked at a parts supply depot during the calendar year 1999 were Month January February March April May June Demand 89 57 144 221 177 280 Month July August September October November December Demand 223 286 212 275 188 312 a. Determine the one-step-ahead forecasts for the demand for January 2000 using 3-, 6-, and 12-month moving averages. b. Using a four-month moving average, determine the one-step-ahead forecasts for July through December 1999. c. Compute MAD, MSE, MAPE for the forecasts obtained in b. Solution: a. MA (3) forecast: 258. 33 MA (6) forecast: 249. 33 MA (12) forecast: 205. 33 b. Month July August September October November December Forecast 205. 50 225. 25 241. 50 250. 25 249. 00 240. 25 Demand 223 286 212 275 188 312 Error -17. 50 -60. 75 29. 50 -24. 75 61. 00 -71. 75 c. MAD = 44. 21 MSE = 2391. 45 MAPE = 17. 91% EMIS 8348 Homework 1 — Part 1 Solutions Problem 2: Observed weekly sales of ball peen hammers at the town hardware store over an eightweek period have been 14, 9, 30, 22, 34, 12, 19, 23. a. Suppose that three-week moving averages are used to forecast sales. Determine the one-step-ahead forecasts for weeks 4 through 8. b. Suppose that exponential smoothing is used with a smoothing constant of Î± = 0. 15. Find the exponential smoothing forecasts for weeks 4 through 8. c. Based on the MAD, which method did better? Solution: a. Week 4 5 6 7 8 b. and c. You may start ES forecast from week 1 or start ES forecast from week 4 using MA(3) forecast for the first period. The following are the results for each of the cases. Starting ES forecast from week 1: Week 1 2 3 4 5 6 7 8 Demand 14 9 30 22 34 12 19 23 ES(. 15) 14 14 13. 25 15. 76 16. 70 19. 29 18. 20 18. 32 MA(3) | Error| ES | Error| MA MA(3) Forecast 17. 67 20. 33 28. 67 22. 67

21. 67 17. 67 20. 33 28. 67 22. 67 21. 67 6. 24 17. 30 7. 29 0. 80 4. 68 7. 263 MADES 4. 33 13. 67 16. 67 3. 67 1. 33 7. 934 MADMA Based on above results, ES(. 15) had a lower MAD over the five weeks Starting ES forecast from week 4 using MA(3): Week 4 5 6 7 8 Demand 22 34 12 19 23 ES(. 15) 17. 67 18. 32 20. 67 19. 37 19. 32 MA(3) 17. 67 20. 33 28. 67 22. 67 21. 67 | Error| ES 4. 33 15. 68 8. 67 0. 37 3. 68 6. 547540 MADES | Error| MA 4. 33 13. 67 16. 67 3. 67 1. 33 7. 934 MADMA Based on above results, ES(. 15) had a lower MAD over the five weeks EMIS 8348 Homework 1 — Part 1 Solutions Problem 3: The sales of a laptop computer in a popular electronic store during the calendar year 2006 were Month January February March April May June Demand 96 110 127 143 161 177 Month July August September October November December Demand 192 210 224 240 259 277 a. Using simple moving average, double moving average and exponential smoothing (with Î± = 0. 15 and 0. 25), determine the one-step-ahead forecasts for July 2006 through January 2007. b. Compute MAD, MSE, and MAPE for the above forecasts. c. Based on the MSE, which method did best? Solution: a. We assume to use the 3-month moving average for both simple and double moving average. Please see the attached Excel file for detail. Please check the sheet " DMA with Level and Trend" in the Excel file for an alternative method to compute double moving average forecasts. b. See the attached Excel file. c. The 3-month simple moving average is the best method for this problem. If an alternative method is used for double moving average forecast (using Level and Trend), the 3-month double moving average is the best method for this problem (see the second sheet in the Excel file).