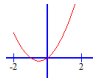
Chapter 2 Homework

CH 2 HW

Recall 3 conditions on $L(e)$:
$L(0) = 0$
$L(e)$ is continuous
$L(e)$ is increasing on each side of 0.

State whether the following potential loss functions meet the above conditions, and if so, whether they are symmetric or asymmetric.

1a. $L(e) = e^2 + e$



Nope on #3

CH 2 HW

Recall 3 conditions on $L(e)$:
$L(0) = 0$
$L(e)$ is continuous
$L(e)$ is increasing on each side of 0.

State whether the following potential loss functions meet the above conditions, and if so, whether they are symmetric or asymmetric.

1b. $L(e) = e^4 + 2e^2$

Yep, and symmetric

CH 2 HW

Recall 3 conditions on $L(e)$:
$L(0) = 0$
$L(e)$ is continuous
$L(e)$ is increasing on each side of 0.

State whether the following potential loss functions meet the above conditions, and if so, whether they are symmetric or asymmetric.

1c. $L(e) = 3e^2 + 1$

Nope on #1

CH 2 HW

Recall 3 conditions on $L(e)$:
$L(0) = 0$
$L(e)$ is continuous
$L(e)$ is increasing on each side of 0.

State whether the following potential loss functions meet the above conditions, and if so, whether they are symmetric or asymmetric.

1d. $L(e) = \begin{cases} \sqrt{e} & e > 0 \\ |e| & e \le 0 \end{cases}$

Yep, and asymmetric

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CH 2 HW

2. Relationships among point, interval and density forecasts. For each of the following density forecasts, how might you infer "good" point and ninety percent interval forecasts? Conversely, if you started with your point and interval forecasts, could you infer "good" density forecasts? Be sure to defend your definition of "good."

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CH 2 HW

2a. Future y is distributed as N(10; 2).

Point: 10

Interval:
Lower: In Excel, =NORM.INV(0.05,10,sqrt(2)) = 7.673826
Upper: In Excel, =NORM.INV(0.95,10,sqrt(2)) = 12.32617

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2b.

$$P(y) = \begin{cases} \frac{y-5}{25} & 5 < y < 10 \\ -\frac{y-15}{25} & 10 < y < 15 \\ 0 & \text{otherwise} \end{cases} \quad \text{SO} \quad F(y) = \begin{cases} \left. \frac{t^2}{50} - \frac{t}{5} \right|_5^y = \frac{y^2}{50} - \frac{y}{5} + 0.5 & 5 < y < 10 \\ \left. \frac{3t}{5} - \frac{t^2}{50} \right|_{10}^y + 0.5 = \frac{3y}{5} - \frac{y^2}{50} - 3.5 & 10 < y < 15 \\ 0 & \text{otherwise} \end{cases}$$

Point: 10 (the distribution is symmetric)

Interval: Setting F(y) = 0.05 and F(y) = 0.95 and solving for y yields the solutions (5+sqrt(1.25, 15-sqrt(1.25)).

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3. Forecasting at short through long horizons.

Consider the claim, “The distant future is harder to forecast than the near future." Is it sometimes true? Usually true? Always true? Why or why not? Discuss in detail. Be sure to define “harder.“

Opinions?

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4. “Real" forecasts vs. “goal" or “advocacy" forecasts.

Many things that seem like forecasts are not at all real forecasts. Every politician forecasts that she will win the election. Should you take such forecasts seriously? Every lawyer forecasts that his client will win. Should you take such forecasts seriously? Simultaneously, hidden away from the public, serious, scientifically disinterested forecasts are routinely made and used successfully in numerous endeavors. The problem is that the public routinely sees the former (e.g., from television pundits) and rarely sees the latter.

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5. Univariate and multivariate information sets.

a. Which of the following modeling situations involve univariate information sets? Multivariate?

i. Using a stock's price history to forecast its price over the next week

Univariate

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5. Univariate and multivariate information sets.

a. Which of the following modeling situations involve univariate information sets? Multivariate?

ii. Using a stock's price history and volatility history to forecast its price over the next week

Univariate response, multivariate predictors

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5. Univariate and multivariate information sets.

a. Which of the following modeling situations involve univariate information sets? Multivariate?

iii. Using a stock's price history and volatility history to forecast its price and volatility over the next week

Multivariate in both response and predictors

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5. Univariate and multivariate information sets.

b. Keeping in mind the distinction between univariate and multivariate information sets, consider a wine merchant seeking to forecast the price per case at which a fine vintage of Chateau Latour, one of the greatest Bordeaux wines, will sell when it is thirty years old, at which time it will be fully mature.

i. What sorts of univariate forecasting approaches can you imagine that might be relevant?

Examine the prices from 1990 through the present and extrapolate in some "reasonable" way.
(Whatever "reasonable" is!)

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5. Univariate and multivariate information sets.

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ii. What sorts of multivariate forecasting approaches can you imagine that might be relevant? What other variables might be used to predict the Latour price?

We might also use information in the prices of other similar wines, macroeconomic conditions, etc.

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5. Univariate and multivariate information sets.

b. Keeping in mind the distinction between univariate and multivariate information sets, consider a wine merchant seeking to forecast the price per case at which a fine vintage of Chateau Latour, one of the greatest Bordeaux wines, will sell when it is thirty years old, at which time it will be fully mature.

iii. What are the comparative costs and benefits of the univariate and multivariate approaches to forecasting the Latour price?

Multivariate approaches bring more information to bear on the forecasting problem, but at the cost of greater complexity.

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5. Univariate and multivariate information sets.

b. Keeping in mind the distinction between univariate and multivariate information sets, consider a wine merchant seeking to forecast the price per case at which a fine vintage of Chateau Latour, one of the greatest Bordeaux wines, will sell when it is thirty years old, at which time it will be fully mature.

iv. Would you adopt a univariate or multivariate approach to forecasting the Latour price? Why?

Opinions?

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6. Assessing forecasting situations.

For each of the following scenarios, discuss the decision environment, the nature of the object to be forecast, the forecast type, the forecast horizon, the loss function, the information set, and what sorts of simple or complex forecasting approaches you might entertain.

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6. Assessing forecasting situations.

a. You work for Airborne Analytics, a highly specialized mutual fund investing exclusively in airline stocks. The stocks held by the fund are chosen based on your recommendations. You learn that a newly rich oil-producing country has requested bids on a huge contract to deliver thirty state-of-the-art fighter planes, but that only two companies submitted bids. The stock of the successful bidder is likely to rise.

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6. Assessing forecasting situations.

b. You work for the Office of Management and Budget in Washington DC and must forecast tax revenues for the upcoming fiscal year. You work for a president who wants to maintain funding for his pilot social programs, and high revenue forecasts ensure that the programs keep their funding. However, if the forecast is too high, and the president runs a large deficit at the end of the year, he will be seen as fiscally irresponsible, which will lessen his probability of reelection. Furthermore, your forecast will be scrutinized by the more conservative members of Congress; if they find fault with your procedures, they might have fiscal grounds to undermine the President's planned budget.

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6. Assessing forecasting situations.

c. You work for D&D, a major Los Angeles advertising firm, and you must create an ad for a client's product. The ad must be targeted toward teenagers, because they constitute the primary market for the product. You must (somehow) find out what kids currently think is “cool," incorporate that information into your ad, and make your client's product attractive to the new generation. If your hunch is right, your firm basks in glory, and you can expect multiple future clients from this one advertisement. If you miss, however, and the kids don't respond to the ad, then your client's sales fall and the client may reduce or even close its account with you.

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7. Box vs. Wiener on Models and Modeling.

We earlier mentioned George Box's memorable view that "All models are false, but some are useful." Norbert Wiener, an equally important applied mathematician on whose work much of this book builds, had a different and also-memorable view, asserting that "The best material model of a cat is another, or preferably the same, cat." What did Wiener mean? What is your view?

Opinions?

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8. Forecasting as an ongoing process in organizations.

We could add another very important item to this chapter's list of considerations basic to successful forecasting - forecasting in organizations is an ongoing process of building, using, evaluating, and improving forecasting models. Provide a concrete example of a forecasting model used in business, finance, economics or government, and discuss ways in which each of the following questions might be resolved prior to, during, or after its construction.

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8a. Are the data “dirty"? For example, are there “ragged edges" (different starting and ending dates of different series)? Are there missing observations? Are there aberrant observations, called outliers, perhaps due to measurement error? Are the data stored in a format that inhibits computerized analysis?

8b. Has software been written for importing the data in an ongoing forecasting operation?

8c. Who will build and maintain the model?

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8d. Are sufficient resources available (time, money, staff) to facilitate model building, use, evaluation, and improvement on a routine and ongoing basis?

8e. How much time remains before the first forecast must be produced?

8f. How many series must be forecast, and how often must ongoing forecasts be produced?

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8g. What level of data aggregation or disaggregation is desirable?

8h. To whom does the forecaster or forecasting group report, and how will the forecasts be communicated?

8i. How might you conduct a “forecasting audit"?

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