

Assignment for mid term CS575

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Create a scratch code of these function

Here e_i represents the evaluated value (actual value) and s_i represents the simulated value (predicted value), $\sigma(x)$ is the standard deviation, \bar{x} is the standard deviation of x . Use the "dataset_metrics" file and compute these metrics. You need to write a python function for each of the metric.

1. bias

$$Bias = \frac{1}{N} \sum_{i=1}^N (e_i - s_i)$$

2. pbias

$$PBias = 100 * \frac{\sum_{i=1}^N (e_i - s_i)}{\sum_{i=1}^N (e_i)}$$

3. Nash-Sutcliffe (NSE)

$$NSE = 1 - \frac{\sum_{i=1}^N (e_i - s_i)^2}{\sum_{i=1}^N (e_i - \bar{e})^2}$$

4. log Nash-Sutcliffe

$$\log NSE = 1 - \frac{\sum_{i=1}^N (\log(e_i) - \log(s_i))^2}{\sum_{i=1}^N (\log(e_i) - \log(\bar{e}))^2}$$

5. correlationcoefficient

$$CC = \frac{\sum_{i=1}^n (e_i - \bar{e})(s_i - \bar{s})}{\sqrt{\sum_{i=1}^n (e_i - \bar{e})^2} \sqrt{\sum_{i=1}^n (s_i - \bar{s})^2}}$$

6. rsquared

$$r^2 = \left(\frac{\sum_{i=1}^n (e_i - \bar{e})(s_i - \bar{s})}{\sqrt{\sum_{i=1}^n (e_i - \bar{e})^2} \sqrt{\sum_{i=1}^n (s_i - \bar{s})^2}} \right)^2$$

7. mse

$$MSE = \frac{1}{N} \sum_{i=1}^N (e_i - s_i)^2$$

8. rmse

$$RMSE = \sqrt{\frac{1}{N} \sum_{i=1}^N (e_i - s_i)^2}$$

9. mae

$$MAE = \frac{1}{N} \sum_{i=1}^N (|e_i - s_i|)$$

10. rrmse

$$RRMSE = \frac{\sqrt{\frac{1}{N} \sum_{i=1}^N (e_i - s_i)^2}}{\bar{e}}$$

11. agreementindex

$$d = 1 - \frac{\sum_{i=1}^N (e_i - s_i)^2}{\sum_{i=1}^N (|s_i - \bar{e}| + |e_i - \bar{e}|)^2}$$

12. covariance

$$Covariance = \frac{1}{N} \sum_{i=1}^N ((e_i - \bar{e}) * (s_i - \bar{s}))$$

13. Kling-Gupta Efficiency (kge)

$$kge = 1 - \sqrt{(CC - 1)^2 + \left(\frac{\bar{e}}{\bar{s}}\right)^2 + \left(\frac{\sigma(e)}{\sigma(s)}\right)^2}$$

14. rsr

$$rsr = \frac{\sqrt{\frac{1}{N} \sum_{i=1}^N (e_i - s_i)^2}}{\sigma(e)}$$

15. volume_error

$$ve = \frac{\sum_{i=1}^N (s_i - e_i)}{\sum_{i=1}^N e_i}$$