Меры ошибок прогноза

$$Среднее\ \bar{X} = \frac{1}{n-1}\sum_{i=1}^{n} x_i \qquad \sigma = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(x_i - \bar{X})^2}$$

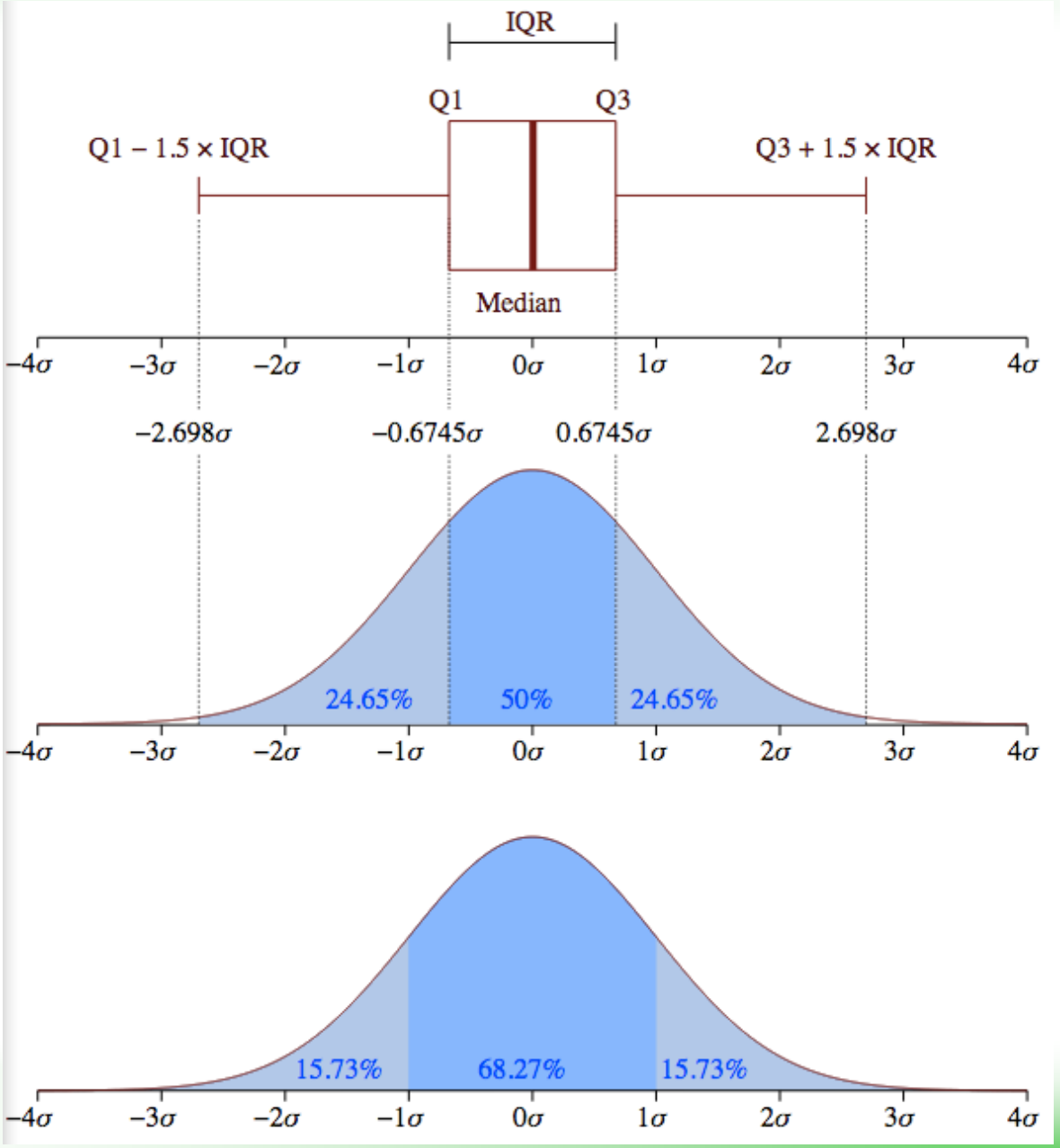
$$\delta_{доп} = 0{,}674\sigma$$

$$Bias = ME = \frac{1}{n-1}\sum_{i=1}^{n}(f_i - x_i) = \bar{f} - \bar{x} \qquad MAE = \frac{1}{n-1}\sum_{i=n}^{n}|f_i - x_i|$$

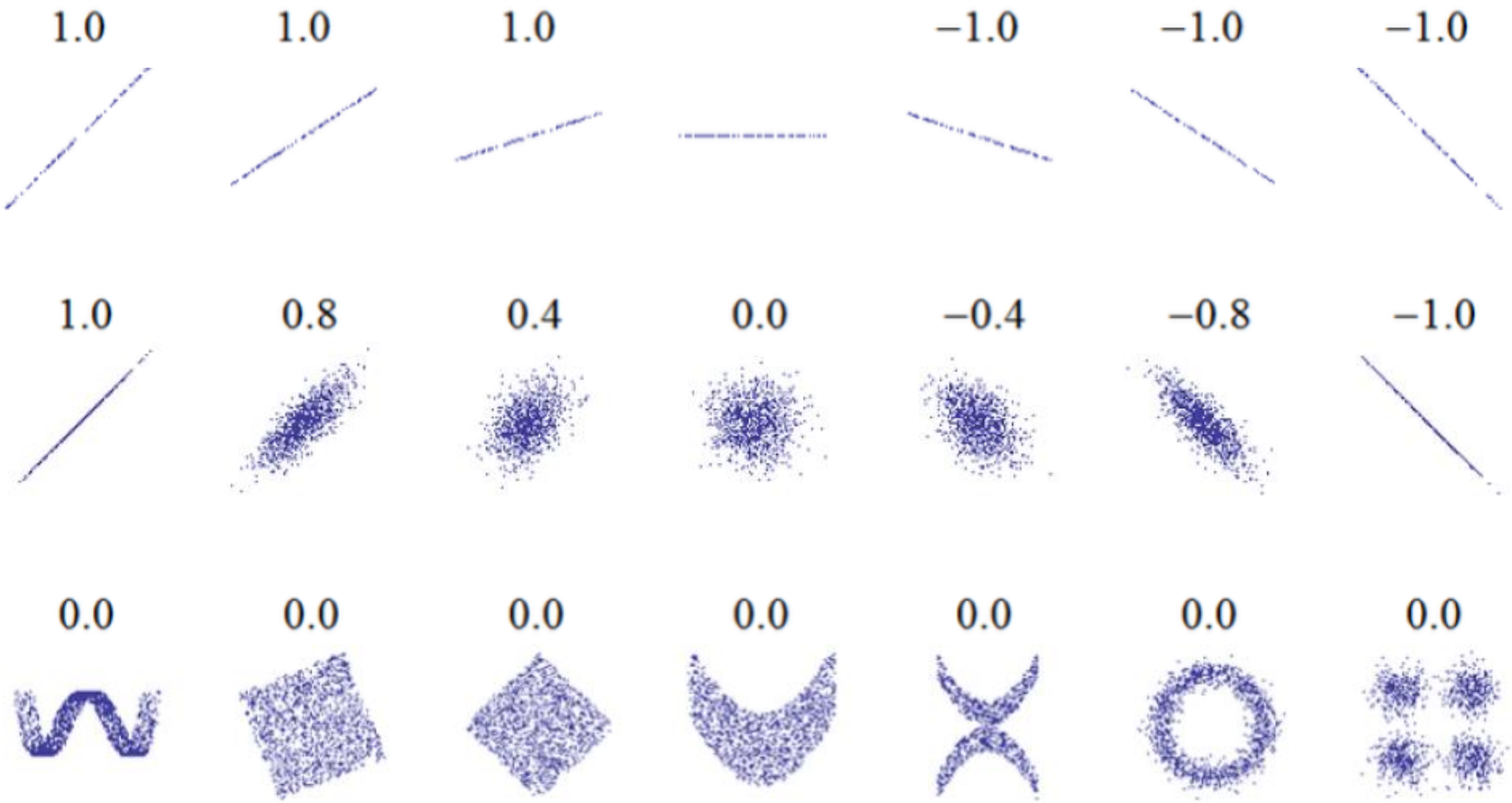
$$MSE = \frac{1}{n-1}\sum_{i=n}^{n}(f_i - x_i)^2 \qquad RMSE = \sqrt{\frac{1}{n-1}\sum_{i=n}^{n}(f_i - x_i)^2}$$

$$R_{f,o} = \frac{\sum_1^N (f_n - \bar{f})(o_n - \bar{o})}{\sigma_o^2 \sigma_f^2} \qquad NSE = 1 - \frac{\sum_{i=1}^N (f_i - x_i)^2}{\sum_{i=1}^N (x_i - \overline{x})^2}.$$

$$[-1; 1] \qquad [-\infty; 1]$$


IQR
Q1
Q3
Q1 − 1.5 × IQR
Q3 + 1.5 × IQR
Median
−4σ
−3σ
−2σ
−1σ
0σ
1σ
2σ
3σ
4σ
−2.698σ
−0.6745σ
0.6745σ
2.698σ
24.65%
50%
24.65%
15.73%
68.27%
15.73%

Коэффициент корреляции



$$\sigma = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(x_i - \bar{X})^2} \qquad RMSE = S = \sqrt{\frac{1}{n-1}\sum_{i=n}^{n}(f_i - x_i)^2}$$

$$\sigma_\Delta = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(\Delta_i - \bar{\Delta})^2}$$

$$\Delta_i = x_i - x_{i+\tau}$$

τ - заблаговременность

$$\bar{\Delta} = \frac{1}{n}\sum_{i=1}^{n}\Delta_i$$

$$\frac{S}{\sigma_\Delta} \in (0;+\infty)$$

Категория	$\frac{S}{\sigma_\Delta}$	$R_{f,o}$
Хорошо	≤0.50	≥0.87
Удовлетворительно	0.51 – 0.80	0.86 – 0.60
Плохо	0.81 – 1.00	0.60 – 0.30
Бесполезно	≥1.00	≤0.30

$$R = \frac{\frac{1}{N}\sum_1^N \left[(f_n - \bar{f})(o_n - \bar{o})\right]^2}{\sigma_o^2 \sigma_f^2}$$

$$\sigma_f^2 = \frac{1}{n-1}\sum_1^N (f_n - \bar{f})^2 \qquad \sigma_0^2 = \frac{1}{n-1}\sum_1^N (o_n - \bar{o})^2$$

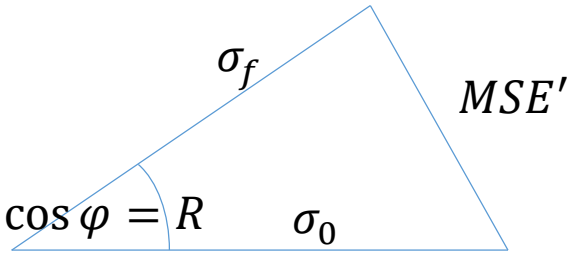
$$MSE = S = \frac{1}{n-1}\sum_{i=1}^N (f_i - o_i)^2$$

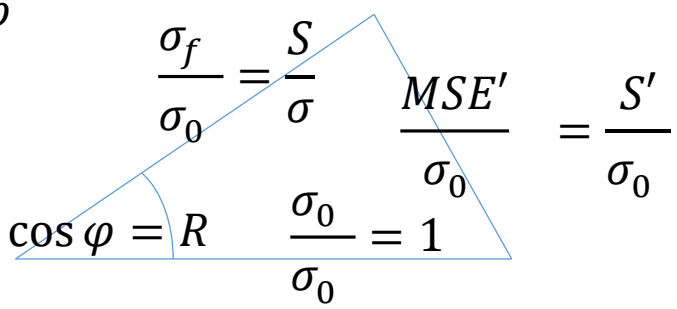
$$BIAS = \bar{o} - \bar{f}$$

$$MSE' = S' = \frac{1}{n-1}\sum_{i=1}^N \left[(f_i - \bar{f})(o_i - \bar{o})\right]^2$$

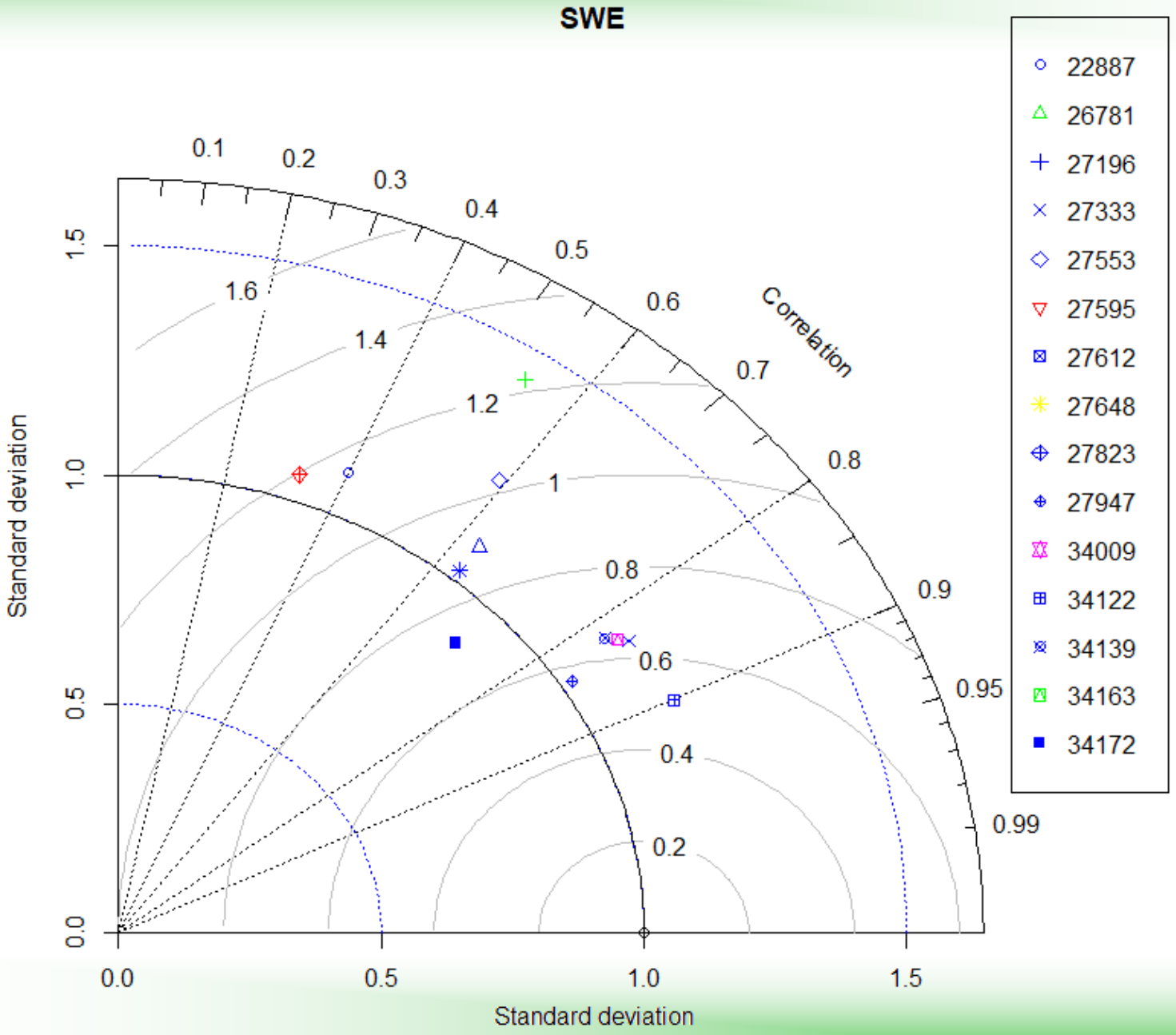
$$MSE' = \sigma_0^2 + \sigma_f^2 - 2\sigma_o \sigma_f R$$

$$c^2 = a^2 + b^2 - 2ab\cos\varphi$$

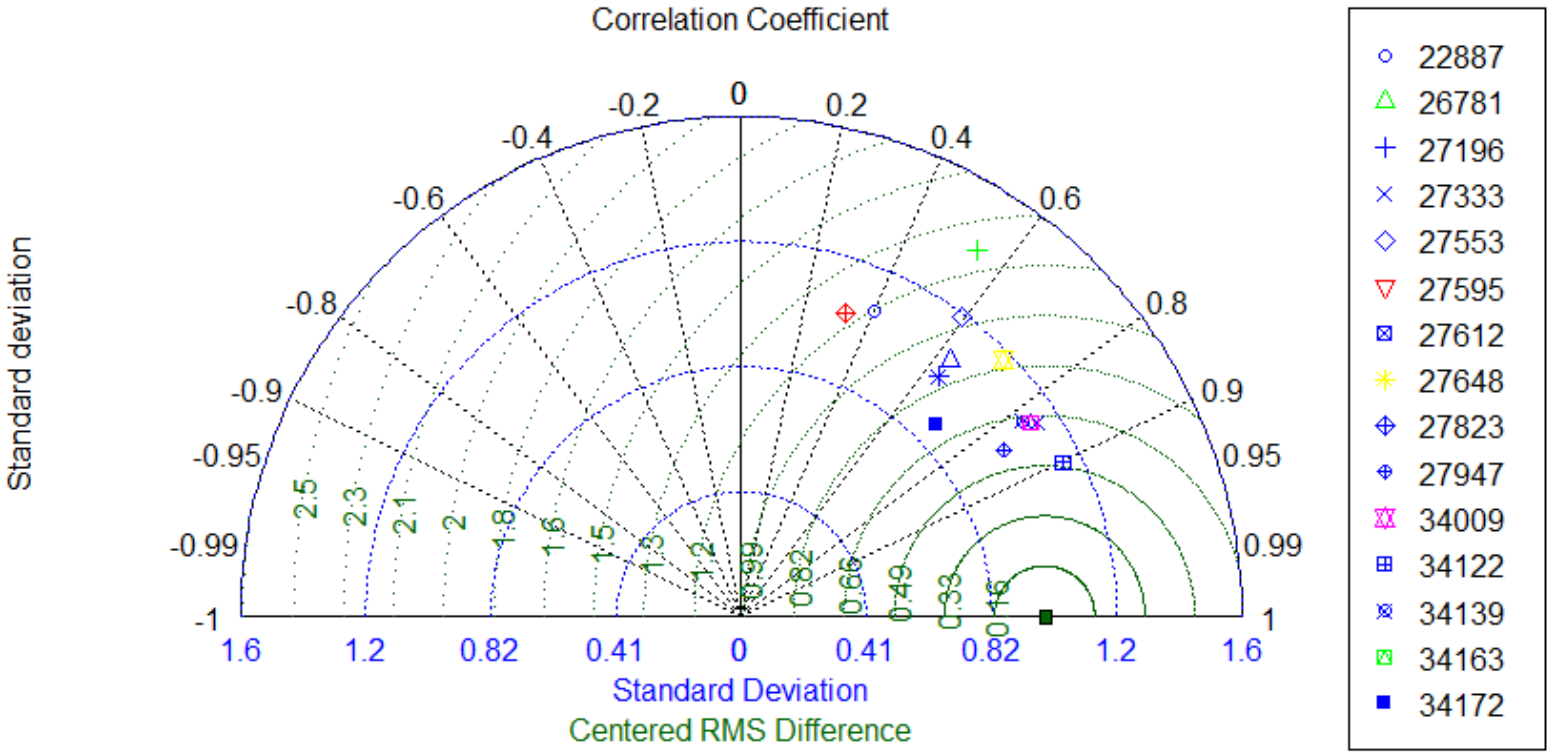




Taylor, K.E.: Summarizing multiple aspects of model performance in a single diagram. J. Geophys. Res., 106, 7183-7192, 2001


SWE
Correlation
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
0.95
0.99
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
Standard deviation
0.0
0.5
1.0
1.5
Standard deviation
22887
26781
27196
27333
27553
27595
27612
27648
27823
27947
34009
34122
34139
34163
34172

SWE



Standard deviation