Claims:

1. An insulation deterioration method executed by a computer device including a CPU that is adapted to determine degree of insulation deterioration occurring in a power transmission cable, the method comprising:

a first step of sequentially generating a plurality of distribution patterns T1…T16 by standardizing a distribution pattern T of a combination of charge amounts and phase angles of each insulation deterioration pulse PL occurring in a period corresponding to several applied voltage cycles of an applied voltage signal SG2;

a second step of executing a first classification process in which the distribution patterns T1…T16 is classified into at least one of class on the basis of a standard distribution pattern for each class wherein each class is adapted to indicate a deterioration stage, wherein each class is determined by comparing the plurality of distribution patterns T1…T16 with a standard distribution pattern which is created in advance and stored in a storage device and wherein a second classification process is executed in which the the plurality of the distribution patterns T1…T16 is classified so that the distribution patterns T1…T16 are grouped into at least one cluster A1,A2 by using a clustering algorithm such as a principal component analysis method or k-means clustering;

a third step of evaluating a classification result by the first classification process on the basis of a classification result by the second classification process; and

a fourth step of determining the degree of progress of the insulation deterioration occurring in the power transmission cable on the basis of an evaluation result in the third step.

2. The method according to claim 1,

wherein in the third step, the reliability of the classification result by the first classification process is calculated on the basis of the classification result by the second classification process, and the classification result by the first classification process is evaluated on the basis of the calculated reliability.

3. The method according to claim 2,

wherein in the third step, the reliability having the classification result of the first classification unit for the distribution pattern as a class i (i=0, 1, 2 and so on) is calculated using the following formula,

[Formula 2]

$$R_i = \sum_{k=1}^{n} r_i A_k \quad \cdots\cdots (2)$$

where the reliability of the classification result of the first classification unit is R_i, the number of clusters classified by the second classification unit so far is n, and the square of a ratio of the class having a classification result i of the first classification unit and the cluster having a classification result A_k of the second classification unit to the distribution patterns in which the classification result by the first classification unit and the classification result by the second classification unit are obtained so far is $r_i A_k$.

4. The method according to claim 1,

wherein in the second step, the generated distribution pattern is classified into any one of the classes using a neural network having learned the standard distribution pattern for each class, and

wherein a learning step of learning the distribution pattern on the basis of the evaluation result in the third step to update the neural network is provided.