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**METHOD OF INCREASING THE ACCURACY OF A DIGITAL MEASURING MICROSCOPE**

A method for improving the accuracy of a digital microscope can be developed using information about the light-signal characteristic and the modulation transfer function. We present a step-by-step algorithm for implementing the method:

1. Determination of the light-signal characteristic (LSK). Carry out an experimental determination of SSC for a digital microscope using calibration tests and measurements. Exploring the range of signals that the microscope can handle and identifying possible areas for improved accuracy.

2. Analysis of the modulation transfer function (PMF). Definition of FPM for a digital microscope system, which determines how well it transmits different spatial frequencies of objects. Identification of areas where FPM improvements can be made to improve resolution.

3. Optimization of system parameters. Taking into account information from SSC and FPM to optimize system parameters such as exposure, focus, and lighting modes. Adaptation of the system to increase the sensitivity to weak signals and increase the accuracy of measurements.

4. Application of signal processing techniques. Consider using signal processing techniques to compensate for artifacts that may occur due to limited resolution or noise. Development of correction and filtering algorithms to improve the quality of received images.

5. Experimental verification. Conducting a series of experiments to test the effectiveness of the proposed improvements. Analysis of the obtained results and adjustment of the method, if necessary.

This method aims to optimize the operation of the digital microscope, increase the accuracy of measurements and obtain high-quality images of objects.

Determining the light-signal characteristic of a digital microscope experimentally is an important stage, as this characteristic provides important information about the sensitivity and linearity of the device. This definition can be used to evaluate how well the microscope responds to weak and strong light signals.

The sensitivity of the microscope to different levels of the light signal is a key parameter. Experimental determination of the light-signal characteristic allows you to adjust the lighting conditions and detector electronics for optimal use of the microscope. In addition, this characteristic allows you to control the linearity of the system, determining how accurately the relationship between the input light signal and the system response is linear. The presence of non-linearity can affect the accuracy of measurements and the quality of display.

Estimating the dynamic range of a digital microscope is another aspect that can be determined using the light signal characteristic. This allows you to understand how effectively the microscope can reproduce a wide range of light intensities, which is important for working with objects of different brightness. Experimental determination of light signal characteristics may include the use of calibration tests and measurements. The result will be a graph showing the dependence of the system's response on the input light signal. This information is key to ensuring accurate measurements and optimizing the imaging conditions of objects in digital microscopes.

Functional transfer modulation determines the operating frequency range for a digital microscope by determining the limit curve obtained during experimental studies and subjected to analysis. The use of the microscope software made it possible to obtain the distribution of the limit curve in a defined range of measurements and save it in a text file. Applying simple mathematical transformations, we determined and constructed a normalized limit curve. This process allows you to accurately determine the parameters of the FPM, taking into account the spectral characteristics of the digital microscope.

The modulation transfer function of the microscope is determined by the specified formula [1-4]. This formula determines how the microscope responds to signal modulation in different frequency ranges, which is key to ensuring high quality and accurate images. Therefore, FPM determines not only the operating range, but also the efficiency of the microscope at different modulation frequencies, which makes it an important parameter for high-precision research and measurements.

, (1)

where is the value of the Gaussian constant;

 - spatial frequency.

Analyzing the graphical dependence of the FPM, it is noted that the curve of the scattering function is subject to the normal distribution law, while the mathematical expectation is defined as one. Thus, it can be considered that this condition is fulfilled, and the use of a digital microscope provides the opportunity to make measurements.

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