# COMPUTER PROCESSING OF ANNUAL RINGS ON WOOD

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**Introduction.** The analysis of the annual tree rings is one of the methods for determining the climate (temperature, precipitation) in the past years and predictions in the future. Modern computer technology and mathematical tools make it easier to analyze and obtain more accurate results for the past, as well as future years.

**Aim.** Determine the dependence of the thickness of the annual tree rings, on temperature and precipitation, using mathematical tools, identification the cycles in the development of trees are the aim of the work. Also make a forecast for the development of the tree in the future.

**Materials and methods.** Photos of a tree cut with a digital camera were made. With the help of the computer program Graph2Digit v0.7.1b, data on the width of the annual rings of the first object of investigation were obtained. In the programs Scilab 5.5.2 and Mathcad 15, graphs of the ring thickness versus time were plotted, a spectral analysis of the obtained data was carried out using the Fourier transform. The results of the conversions carried out in two computer programs coincided. Based on the results, the time cycles in the development of the trees were determined. These data are compared with data on the thickness of annual rings. A forecast is made for the thickness of annual rings. The graphs of the dependence of the thickness of annual rings of the second object of the study, on the time of its growth, are constructed. A comparison is made between the thickness of annual rings, the amount of precipitation and temperature, over a period of time.

**Results and discussion.** The representation in the form of a Fourier series made it possible to determine the time cycles in the growth of a tree. We were able to make a forecast of the thickness of annual rings, and to determine its comparative accuracy, as well as compare the annual rings, temperature and precipitation thickness, drawing conclusions about the relationships between them.

**Conclusions.** With the help of analysis of annual tree rings, one can judge climate changes at a certain time interval and determine the periodicity in the growth of a particular tree. You can make a prediction about the growth of the tree in the future. Mathematical modeling has shown that, such a forecast can be made for several years, but not more. The applied research methods can give accurate results, and within the limits of the specificity to bring appreciable advantage in various spheres of activity