It can be concluded that superresolution can be widely used in many spheres of human activity. One of the main advantages of super-resolution is that it allows you to increase the resolution of an image without significant loss in quality, which usually occurs with the standard image upscaling method. However, it should be noted that super-resolution can be a cumbersome process that requires a lot of resources. Such a process can take a long period of time and require a lot of computing power.

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METHODS OF MODELING CONTACT OF ELASTIC BODIES

The calculation of strength and reliability of various critical elements of structures and functional equipment assemblies is a mandatory stage of design. Many of these elements have pronounced contact within a certain surface. Data on the stress-strain state of such elements and assemblies can be obtained using modern mathematical modeling techniques. Only for a relatively small number of contact problems, analytical solutions have been obtained based on the theory of elasticity. Therefore, numerical methods are the most promising way to study the contact interaction of bodies. Many scientists and researchers have worked on the modeling of the contact of elastic bodies. There are some of the most notable scientists in this field:

- Gerard A. Maugin, who investigated the contact of elastic bodies and developed the concept of elastic rods;

- Jean-Jacques Moreau, who made significant contributions to the mathematical theory of contact of elastic bodies;
- Antonio Curnier, who developed the finite element method for modeling the contact of elastic bodies;
- Klaus-Jürgen Bathe, who made significant contributions to the field of mechanical system modeling, including the contact of elastic bodies;
- Theodore von Kármán, who studied problems related to the contact and friction of elastic bodies.

In the context of contact interactions between multiple bodies, the use of structured meshes is often not feasible. The need for unstructured meshes arises, for example, in calculations using domain decomposition methods, as well as in the construction of locally refined meshes. Coupling of unstructured finite elements at contact lines can be achieved using iterative procedures, which ensure the continuity of the approximate solution or the normal components of its derivatives and form the so-called alternative Schwarz methods [1; 2]. Direct procedures that use the method of Lagrange multipliers [3; 4], penalty methods [5], and mortar methods [6–8] are also possible.

There are many programs available for modeling contact between elastic bodies. The most popular programs for modeling contact between elastic bodies currently include:

7. ANSYS – a software for numerical solid mechanics modeling, which has built-in tools for modeling contact between elastic bodies.
8. Abaqus – a program for complex engineering problems that includes modeling of deformation, strength, and dynamics of elastic bodies in contact.
9. LS-DYNA – a program for numerical modeling of solid dynamics systems, which has built-in tools for modeling contact between elastic bodies.
10. COMSOL Multiphysics – a software for numerical modeling of various physical processes, which also has tools for modeling contact between elastic bodies.

11. OpenFOAM – a program for numerical modeling of various physical processes, typically used for modeling gas and liquid media, but which also has built-in tools for modeling contact between elastic bodies.

12. SimScale – an online platform for numerical modeling, which has built-in tools for modeling contact between elastic bodies.

Calculation of strength and reliability of structural elements and functional units of equipment is a mandatory stage of design, and obtaining data on the stress-strain state of such elements and units can be achieved using modern mathematical modeling tools. Analytical solutions have been obtained for many contact problems in elasticity theory, but for more complex problems, numerical methods and the use of software such as ANSYS are the most promising research approaches for studying contact interactions between bodies.

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