

Yu.I.Bobrovnikii, V.M.Byrdin

TWO SIMPLE MECHANICAL STRUCTURES CARRYING BACKWARD WAVES

Blagonravov Mechanical Engineering Research Institute, Russia, Moscow, M. Kharitonievsky St., 4.
Tel. 135-40-48. Fax: 135-85-30. E-mail: V_M_Byrdin@front.ru

Backward waves are waves with the group and phase velocities of opposite directions. Only a few structures are known where such waves exist. In the paper, two new easily realisable structures – one is one-dimensional discrete system and the other is two-dimensional continuous system – are proposed in which backward waves can exist in a wide frequency range. Dispersion of the waves is analysed.

V.M.Byrdin

**BACKWARD-WAVE'S DISPLACEMENT OF RAYS, BIINVERSION OF RAYS,
BIINVERSION OF DIRECTIONAL PATTERN, SELF-FOCUSSING AND OTHER EFFECTS
OF THE INTER-FERENTIN FND DIFFRACTION OF THE SPATIAL WAVES AND
WAVEGUIDE MODES**

Blagonravov Mechanical Engineering Research Institute, Russia, Moscow, M. Kharitonievsky St., 4.
Tel. 135-54-36. Fax: 135-85-30. E-mail: V_M_Byrdin@front.ru

Are investigated (studied) back - wave (BW) of a phenomenon of an interference and diffraction at reflection, interception and transit of a demarcation, layer, package(packet) in waveguide systems frames. The possible (probable) actual mediums and waveguides with BW-modes are discussed. The analogy between wave phenomena of volumetric modes in systems with three-dimensional homogeneous mediums and normal - in flat wave-guide systems is carried out (conducted). The problem of idealized definition of a backward wave is analyzed. The kinematic problems are esteemed, and the geometry-optical method will be used. Reflection, interception etc. the transformations (conversion) are anomalous, are negative only for opposite surges (straight line - return). The considerable negative displacement of opposite beams (rays) on a layer is counted. Are studied an interference, self-focusing and kvasi-absoluting (or "super" -) focusing. Probably narrow of divergent bundles, geometrical penumbra both directional diagram (DD) and elimination e ÷ of side lobes. The inverse (turn) of the map is demonstrated at a BW-interception and double turn DD in a far-field region.

V.M.Byrdin

**ON PHYSICAL PRINCIPLES AND MATHEMATICAL CONDITIONS OF RADIATION AND
ON CORRECTION OF WAVE'S PROBLEMS (PHYSICAL AND METATHEORETICAL
ASPECTS)**

Blagonravov Mechanical Engineering Research Institute, Russia, Moscow, M. Kharitonievsky St., 4.
Tel. 135-54-36. Fax: 135-85-30. E-mail: V_M_Byrdin@front.ru

The principle of a wave impulse is offered and the modification of a principle of limiting (marginal) absorption is given. The methodical identity of philosophy of radiation is demonstrated and their general (common) equivalent - principal, or imperative, positively of a group velocity emerges. For laminated waveguides of systems of one class the conditions of radiation are formulated and the absence of backward waves is established. The physical correctness of wave problems instituted (spotted) through verification of the theory is analyzed. Are put and the new problem of correctness, in sense of a wave quenching is studied. The structural absorption coefficients of 2 kind should be only positive going. A correctness and partly principles of radiation subject's metatheoretical to a problematic.