Non-Linear Cosmological Redshift According to General Relativity DMITRI RABOUNSKI, Retired — A new method of calculation of the frequency of a photon is applied. It means solving the scalar geodesic equation (equation of energy) of the photon. In the space of Schwarzschild's mass-point metric, the well-known gravitational redshift has been obtained. No frequency shift has been found in the space of Gödel's metric, and in the space of Einstein's metric (a homogeneous distribution of ideal liquid and physical vacuum). The other obtained solutions manifest a cosmological effect: its magnitude increases with distance travelled by the photon. This is the parabolic cosmological blueshift found in the space of Schwarzschild's metric of a sphere of incompressible liquid, and in the space of a sphere filled with physical vacuum (de Sitter's metric). The exponential cosmological redshift has been found in the expanding space of Friedmann's metric (empty or filled with ideal liquid and physical vacuum). The redshift is non-linear when approaching the event horizon, where it reaches the ultimate hugh value $z = e^{\pi} - 1 = 22.14$. This explains the observed accelerate expansion of the Universe. These results were obtained in the purely geometric way, without the use of the Doppler effect. The paper has been submitted to The Abraham Zelmanov Journal.

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