PROPAGATION OF COSMIC RAYS, AN ANALYTICAL MODEL

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Supernovae are considered as the most probable sources of galactic cosmic rays. In this analytical approach, we investigate the influence of the discrete nature of this kind of CR-sources on the CR-propagation and spectrum measured at earth. We use a diffusion model considering three independent spatial coordinates. As this is an analytical approach, we only consider the most important interactions with the interstellar medium: continuous and catastrophic losses. We assume a geometry of a thin disk filled with gas, containing the sources embedded in a halo, which is assumed to contain little gas.
We present the solution for the full system in the steady state case for arbitrary CR source distributions in the Galactic disk. In the time-dependent case the Green's function for the disk and solutions in the halo are given.