Absolute and convective instabilities in the numerical model of VLF emissions generation

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The numerical model is suggested to describe joint generation of different types of VLF emissions: hiss and choruses. The hiss generation is provided with convective instability at cyclotron interaction of energetic particles with VLF waves. The discrete emissions are excited in the process of the absolute instability development (by analogy with back-wave oscillator) at presence of step-like velocity distribution of energetic particles. The transition from hiss to the discrete type of generation happens when the efficiency of convective interaction decreases and the absolute instability starts. The model allows us to describe such features of natural VLF emissions, as: 1) Long-period self-modulation of hiss at weak input streams. 2) Increase of maximum amplitude and frequency in hiss near to the beginning of a discrete element. 3) Increase of following frequency of chorus elements with increase of hiss amplitude. 4) Power-law distributions of time intervals between chorus elements.
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