COMPARISON OF SOBOLEV APPROXIMATION WITH THE EXACT ALI CALCULATION IN P Cygni TYPE PROFILE

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Sobolev approximation can be adopted to a macroscopic supersonic motion, compared to random (thermal) one. It has recently beem applied not only to the winds of hot early type stars, but also to envelopes of late type giants and/or supergiants. However, since the ratio of wind velocity to stochastic one is comparatively small in the winds of these stars, the condition for applying the Sobolev approximation is not fulfilled any more. Therefore the validity of the Sobolev approximation must be checked.

We have calculated exact P Cygni profiles with various velocity ratios, V_{∞}/V_{sto}, by means of the accelerated lambda iteration method, comparing with those obtained by the Sobolev approximation. While the velocity ratio decrease, serious deviations have been occured over the whole line profile. When the gradual increase in the velocity structure happens near the surface of star, the amount of deviations become more serios even at the high velocity ratios. The investigations have been applied to observed UV line profile of CIV in the Copernicus spectrums of ζ Puppis and NV of τ Sco which has an expanding envelope with the gradual velocity increase in the inner region, The Sobolev approximation has give the serious deviations in the line profiles.