NLBCPE was developed to solve the parabolic equation with nonlocal boundary conditions. The theoretical framework of this problem was proposed by Yevick and Thomson (Nonlocal boundary conditions for finite difference parabolic equation solvers, JASA, 1999).

These codes are just based on the horizontal homogenous environment and two layers propagation media problem. However, it is easy to extent its function to range-dependent environment and multi-layer problems.

Besides the solvers of NLBCPE, the tangent linear codes and the adjoint codes of NLBCPE are also provided, which will be helpful for the users to solve inverse problems, such as ocean acoustic tomography and geoacoustic inversions.

**It is easy to run these codes on Fortran platform. The users can change the environmental and source parameters in “input.inp” file according to their own requirements. The computation grid should be set in “gridmod” module through arguments *rmax*, *dr*, *zmax*, and *dz*.**

The input parameters for the given example were set to those used for Figs. 2-4 (Yevick and Thomson, JASA, 1999). The correctness of the tangent linear code, the adjoint codemodel, and the gradient computation was checked by the method provided by Zhao and Wang (Ocean acoustic tomography from different receiver geometries using the adjoint method, JASA, 2015)

These codes were developed by Xiaofeng ZHAO and the copyright belongs to PLA University of Science & Technology. The lastest version was updated at Nov. 8, 2015. Any publications using these codes are encouraged to cite “Ocean acoustic tomography from different receiver geometries using the adjoint method”. Any problems about running or using these codes can contact with Xiaofeng Zhao (zxf\_best@126.com). Any new modifications to these codes are also encouraged to send to Xiaofeng Zhao.

These codes are just provided for research purpose. Anyone cannot use these codes for business purpose.