**MATLAB Codes for Curvature Based Tortuosity Evaluation**

**1 Introduction**

The Matlab codes attached gets an image of retinal vessels as input and returns the tortuosity using the measures described in the paper "On curvature based automatic grading of retinal blood vessel tortuosity". The program includes

1. A vessel detection code (vessel\_detection function)
2. A bifurcation and crossover elimination code (BifurcationFun1 function)
3. Tortuosity evaluation using nonlinear curvature method (tau\_nl function)
4. Tortuosity evaluation using curvature, evaluated based on crossover method (tau\_cp function)
5. Tortuosity evaluation using curvature, evaluated based on trigonometrial method (tau\_tr function)

For detailed discussion of each method, see the paper.

**2 Using the Codes**

The codes included can be used, free of charge, for research and educational purposes. Copy, redistribution, and any unauthorized commercial use are prohibited. Any researcher reporting results that use the codes must acknowledge the work of the EIARG by adding the following information:

"A novel curvature based algorithm for automatic grading of retinal blood vessel tortuosity (preprint)".

In addition, we appreciate to hear about any publications that use the tortuosity evaluation methods. Feedback on the codes and this website is also welcomed. The person to contact is Hamid Reza Pourreza (hpourreza@ieee.org)