Booth’s lemniscate and directional errors

Adam Wolski (1) and Andrzej Banachowicz (2)

(1) Maritime University of Szczecin, Department of Marine Navigation, Szczecin, Poland, (2) West Pomeranian University of Technology, Department of Artificial Intelligence and Applied Mathematics, Szczecin, Poland

There are two aspects of position coordinates accuracy in navigation: global accuracy and local accuracy – relative to navigational dangers. The latter case refers to the assessment of position (distance) accuracy relative to the nearest navigational danger that is a hazard to navigation. The directional error is a relevant measure for such assessment.

The directional error curve is analyzed in this article as a particular case of the Booth’s elliptical lemniscate. The curve graph illustrates the confidence interval of point position errors in a given direction (about 68%).