

EXTRACTION OF CARTOGRAPHIC CONTOUR LINES USING DIGITAL TERRAIN MODEL (DTM)

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The base map covers the whole French territory and contains about 1810 sheets. Updating this series has been done manually for more than 30 years until the interactive update that has been added recently. The contour lines of these maps are initially obtained by photogrammetric restitution or by the generalization of this restitution.

The construction of the digital terrain model (DTM) can be done by using these contour lines.

In 2004, the French mapping agency (IGN) launched the project « New Base Map » to construct a production line for the topographic maps of scale 1 : 25 000 and 1: 50 000. Using the topographic database BD TOPO®, which covers France, this digital production line exploits the vector database BD TOPO® and many other complementary sources.

The project aims also to automate the extraction of contour lines, and take advantage of the high resolution DTM data recently available in the agency. These data come from automatic correlation, or they are produced using new sensors (either lidar or radar).

The high resolution DTM progressively available in IGN is a breakthrough to extract cartographic elements such as the cartographic contour lines, the points of mountain pass, and the summits.

Many articles focalize on the production of contour lines like (Riegler and Li, 2006) and (Wang, 2008). The difference in our work is that we do the most of processing by manipulating the DTM, not the contours themselves, which make the contours more relied to the real landscape.

In a precedent paper, we presented our research for producing cartographic contour lines from DTM. Since then, the method has been developed and implemented at the agency in order to have an automatic production tool for the contour lines.

In our article, we will focus on the extraction of cartographic contour lines with interlines of equidistance 5 or 10 m, from a DTM of sufficient resolution (5 m step size). We provide technical details with the problem resolved during the implementation (composed of 5 steps). As the problematic of contour lines differs in accordance with the terrain type, The automatic distinction of the type of terrain has been used for applying different treatment according to the nature of terrain.

At last, We present our methods for extracting summit points and mountain pass points, and finally present the results obtained over different types of regions.