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Robotics Sensing and Navigation

Homework 3 Reading

There are numerous different ways to create maps, each with its own advantages as well as drawbacks. Although there are definitely certain groups of map projections that are a better fit for certain applications, it is never guaranteed that you can be using the absolute best map projection, simply due to the sheer amount of different projections. The only similarity between all projections is the fact that there are always latitude lines and longitude lines in order to identify the location of points on earth.

When choosing which map projection to use, there are generally six different characteristics that must be taken into account. These characteristics include area(equal area vs other), shape(conformal or orthomorphic), scale(minimizing the error due to scale by carefully choosing the few lines which remain true), direction(how accurate local directions are with respect to other locations or the center of the map), special characteristics(such as which specific subset of lines happens to be straight), and method of construction(not as significant due to rise of computers). Furthermore, while these characteristics are regularly used in the construction of a map, they are significantly more difficult to recognize in existing maps.

Returning to the topic of longitude and latitude lines, they are based off of numerous physical and one arbitrary point on the spherical globe we know. The North and South Poles, combined with the Equator form the top, bottom, and center parallels of latitude respectively, with circles drawn equally spaced around the entire globe forming all the other parallels of latitude. With respect to meridians of longitude, they form vertical lines from the North Pole to the South Pole, crossing all parallels of latitude at a right angle. Whereas the equator is marked as 0 degrees due to its center for the earth, the prime meridian, which is the 0 degree marker for meridians of longitude, was chosen completely arbitrarily