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# Geodesic in Java

Enhancing the Presence of Geodesy on the Internet

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☞ Geodesy and geodesic

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# Geodesy

☞ Geodesy is the science of determining the shape and size of the Earth.

☞ Geodesy: measurements $\Rightarrow$ maps

☞ Geodesy includes photogrammetry, remote sensing, global positioning systems, geodetic astronomy, engineering survey, cadastre, hydrography and cartography.
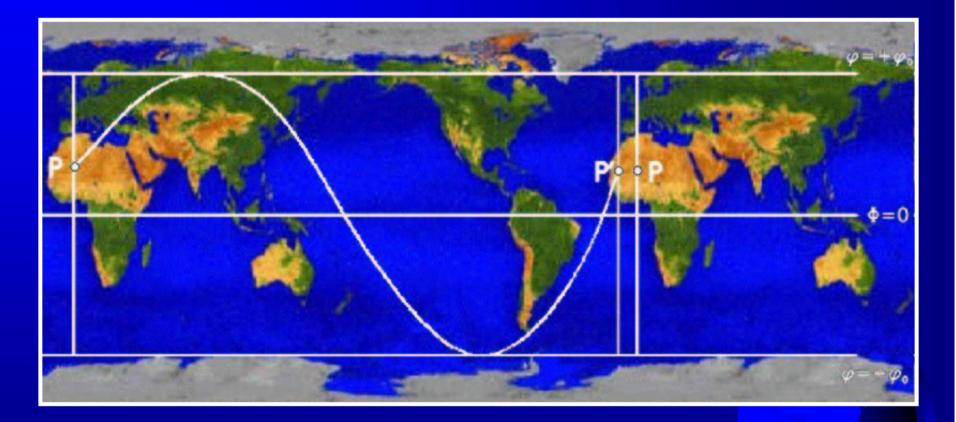
# Geodesic

) Geodesic is the shortest path that connect two points on a surface.

    – plane $\Rightarrow$ line

    – sphere $\Rightarrow$ great circle

    – general surface $\Rightarrow$ general geodesic

) A widely popular concept bearing the name of geodesy.

# Classical approach

- The figure of the Earth is the ellipsoid of revolution.

- The formula of the geodesic:

$$r \sin\alpha = \text{const.}$$

  where     $r$ - radius of the parallel

                   $\alpha$ - azimuth

- Equator ($r=R$, $\alpha= 90°$ or $270°$) and meridians ($\alpha= 0°$ or $180°$) are geodesics.
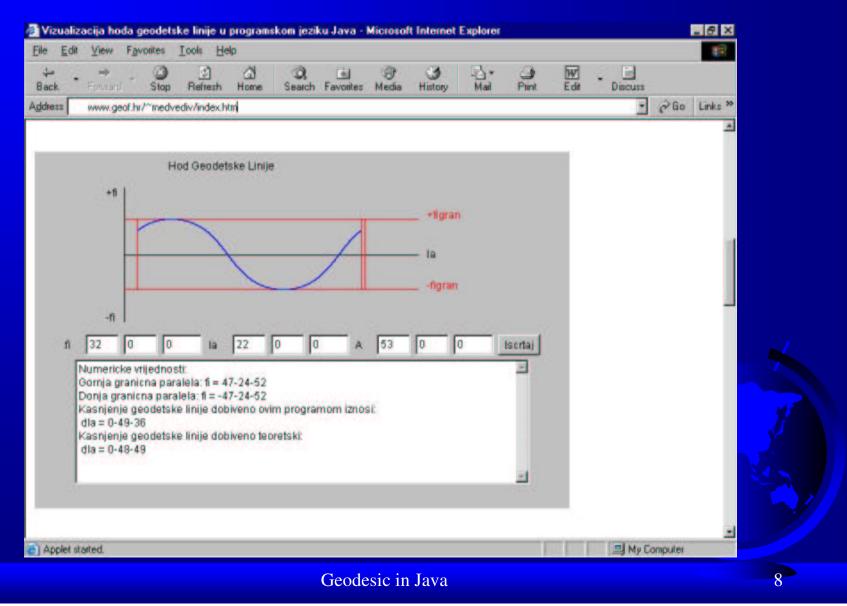
- General case: a complex curve

# "How to lie with maps"



☞ 85% of graduate students answered that the geodesic on the globe has approximately sinusoidal form!

# Java and geodesy

- Programming in geodesy: usually procedural translation of formulae (FORTRAN, BASIC)

- Java course: a single seminar in 9$^{th}$ semester (experimentally)

- Benefits: object-oriented, platform independent, Internet enabled language with GUI
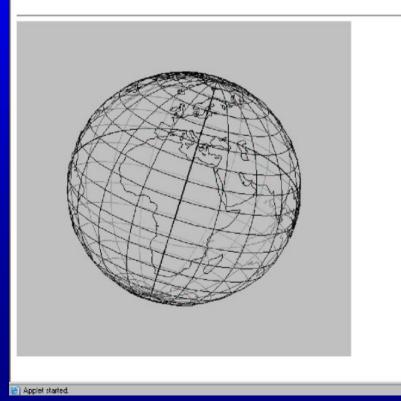
- Feasible!

# Geodesic in Java: 2D

# Geodesic in Java: interactive 3D

3D Model: Hod geodetske linije - Microsoft Internet Explorer

File  Edit  View  Favorites  Tools  Help

Back  Forward  Stop  Refresh  Home  Search  Favorites  Media  History  Mail  Print  Ed

Address  www.geof.hr/~medvediv/GeoLin3Dg.html

## 3D Model: Hod geodetske linije

Applet started.

- ☞ advanced concepts of Java
- ☞ 3D model is movable
- ☞ no more doubts about the approximate shape of the geodesic for the students after looking at the applet

# Conclusion

☞ Advanced 3D concepts implemented as 3D applets help in clearing the illusions caused by classical maps, especially as global features are explored.

☞ Presentation in the Internet is a powerful tool of communication with current, former and future students of geodesy.

☞ Side-effect: learning an object-oriented, platform independent, Internet enabled programming language is useful for future managers of spatial information.