A Quick Introduction to Tecplot

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Tecplot is a plotting software with outstanding 2D and 3D capabilities. It helps to explore raw data from simulations and experiments and generate state of the art graphical representations. Tecplot can be used to create animations and presentation-quality plots.

Tecplot not only creates high-quality data visualization, but also supports data adjustment, multiple X- and Y-axes, logarithmic scales, bar charts, error bars and various scatter symbols. It can handle arbitrary data point spacing and data organized in a variety of grid structures (from fluid dynamics, electrodynamics and other simulations). The data points can be arranged into curvilinear, triangular, quadrilateral or unstructured grids. It can also interpolate and triangulate the data points.

Tecplot can display up to 128 plots. Objects can be moved and resized interactively and 3D figures can be easily rotated. The software also provides an option for a light-source or translucency and offer a more realistic view of the visualizations. The 3-D figures can be analyzed by drawing slices or plotting iso-surfaces. Tecplot can be automated with the use of macros and Add-Ons. More informations is available at the website[1].

- **XY Plotting**
  Scatter plots, line plots, bar charts, semi-log plots, log-log plots, error bar plots
- **Polar Plotting**
  Polar line plots (r, θ)
- **2-D and 3-D Plotting**
  Mesh Plots, Contour Plots, Vector Plots, Scatter Plots
- **Animations and Movies**
  Animation Tools, Macros, Export AVIs
- **Exploration and Analysis**
  Slicing Tool, Iso-surface Tool, Streamtrace Tool, Contour Tool, Data Extraction, Curve Fits, Plot Approximation Mode, Outer-Surface Extraction
- **Data Manipulation**
  Create, Alter and Transform Data, Interpolate (linear, inverse-distance, and kriging), Triangulate
- **Outputting Plots and Data**
  Direct Printing, EPS, JPEG, BMP, PNG, TIFF, PostScript, bitmap, Sun Raster bitmap, Export Movies (Flash and AVI)
- **Data Input**
  HDF, PLOT3D, FLUENT, CGNS, Gridgen, DXF, DEM, comma- or space-delimited ASCII, native Tecplot ASCII, and Tecplot binary files, Custom Data Reader (Tecplot Add-on Developer's Kit)
- **Automation**
  Tecplot Add-on Developer's Kit (C, C++, FORTRAN), Macros

1http://www.tecplot.com/support/tecplot_addons.htm

Line Plotting:
Line plots in Tecplot are composed of the graphs of one or more pairs of variables (XY pairs in XY Line plots or Theta-R pairs in Polar Line plots). These pairs and their dependency relations are defined in Tecplot as mappings. They are defined using the ***Plot -> Mapping Style*** dialog. The axes can be modified using the ***Plot -> Axes*** menu. Error bars and symbols can be added from the ***Sidebar*** menu.

2-D and 3-D plotting:
The mesh, contour, vector and scatter plots can be modified from the ***Sidebar*** menu. More detailed options can be defined in the Plot menu. The lightening and the translucency on the plot can be also modified during the 3-D plotting regime.

Animations and Movies:
Tecplot can animate contour levels, slices and streamlines. The movies can be exported to AVI and Flash files. By predefined macros the users can create movies of rotation or zooming into and out of the filed. These features are defined in the ***Tools -> Animate*** and ***Tools -> Quick Macro Panel*** dialogs.

Extrapolation and Analysis:
The Tecplot slicing tool is used to create slices from the 3-D field, the iso-surface tool – to display iso-surfaces and the streamtrace tool – to draw streamlines. They can be used either from the ***Sidebar*** or from the ***Plot*** menu. Slices and iso-surfaces can be extracted from the ***Data -> Extract*** menu.

Data Manipulation:
Data in Tecplot can be created, altered or transformed. The menu ***Data -> Alter*** can be used to create data by specifying equations and to transform coordinates. Data points and whole variable can be deleted from ***Data -> Delete***. Data can also be interpolated using ***Data -> Interpolate***. Three different interpolation methods are available – linear, inverse-distance and kriging. The menu ***Data -> Probe At*** can be used to isolate data points of interest and ***Data -> Spreadsheet*** – to view all the data.

Outputing Plots and Data:
The workspace can be directly printed or exported as image file via the ***File -> Export*** menu. Supported formats include EPS, EPS, JPEG, BMP, PNG, TIFF, PostScript, bitmap, Sun Raster bitmap. Movies can be exported from the ***Tools -> Animate*** menu.

Data Input:
Tecplot supports many input formats - HDF, PLOT3D, FLUENT, CGNS, Gridgen, DXF, DEM, comma- or space-delimited ASCII, native Tecplot ASCII, and Tecplot binary files. They can be imported from the ***File -> Import*** menu. Variables can be either read from the data file or specified by the user, depending on the imported format. For example, variable names from HDF files are read automatically and from text files – defined by the user. A native Tecplot ASCII files uses the following header:

```
TITLE="Title of the Data"
VARIABLES ="variable name one", "variable name two", "variable name three"
ZONE T="PostGrid", N=1228413, E=1151872, F=FEPOINT, ET=BRICK
```

Add-Ons and Macros can be downloaded from the web site:
http://www.tecplot.com/support/tecplot_addons.htm