PLOTTING VECTOR FIELDS IN MVT

2D and 3D vector fields can be plotted in MVT, and it does a pretty nice job with them. You don’t get a whole lot of control over the display options, but the default seems to create some nice looking vectors.

Vector fields are located under Tools>>Vector Plotting Tools>>Vector Field Plotter.

From there, there’s a choice of 2D and 3D plotting tabs.

Functions are in the form

\[ \mathbf{F}(x, y) = M(x, y)i + N(x, y)j \] (2D)

\[ \mathbf{F}(x, y, z) = M(x, y, z)i + N(x, y, z)j + P(x, y, z)k \] (3D)

so it’s just a matter of entering the component functions \( M \), \( N \), and \( P \).

The one thing with the 2D plotter that I’ve corrected before the screen shot is the scaling – the default window expands to the full width of the screen, so you get a much longer \( x \) axis than a \( y \) axis. All I did was grab the corner of the window and drag until square.
Here’s a 2D plot of $\mathbf{F}(x, y) = x^2 y \mathbf{i} + (x - y) \mathbf{j}$:

The default view seems to be $x \in [-1, 1], \ y \in [-1, 1]$. Go into Show Options if you want to change that. Other options (such as number of vectors shown and color) are under the Appearance Options tab.
Here’s a 3D plot of \( \mathbf{F}(x, y, z) = x^2 \mathbf{i} + (x - y + z) \mathbf{j} + (2x - z) \mathbf{k} \)

(I checked the “Rainbow Arrows” option on this one 😊 - under Appearance Options.)