

Vectors (1B)

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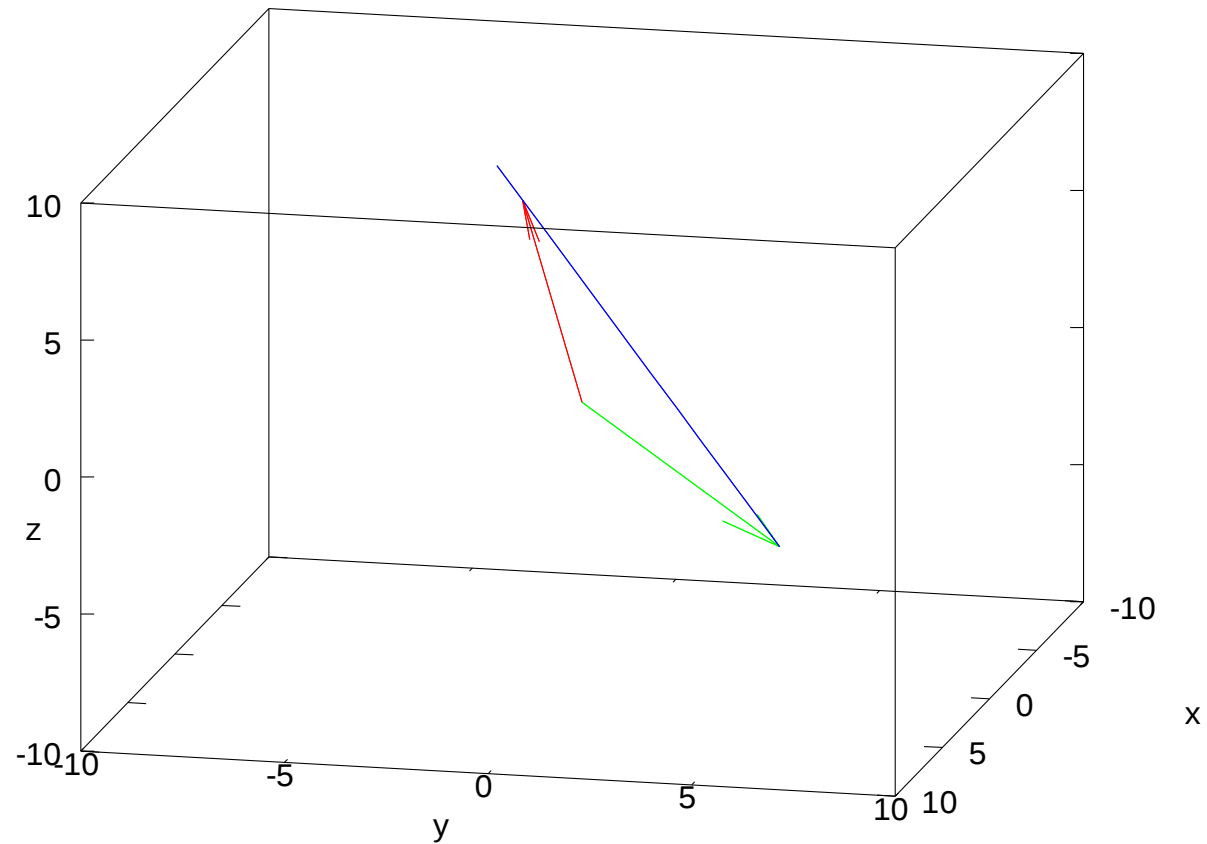
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Line Equation

Line passes through $(2, -1, 8)$ and $(5, 6, 3)$

$$\begin{aligned}x &= 2 - 3t \\y &= -1 - 7t \\z &= 8 + 11t\end{aligned}$$



Line Equation Plotting

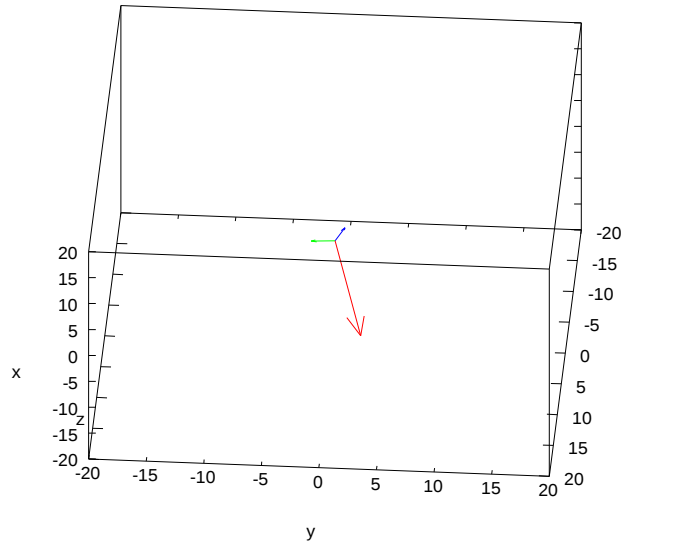
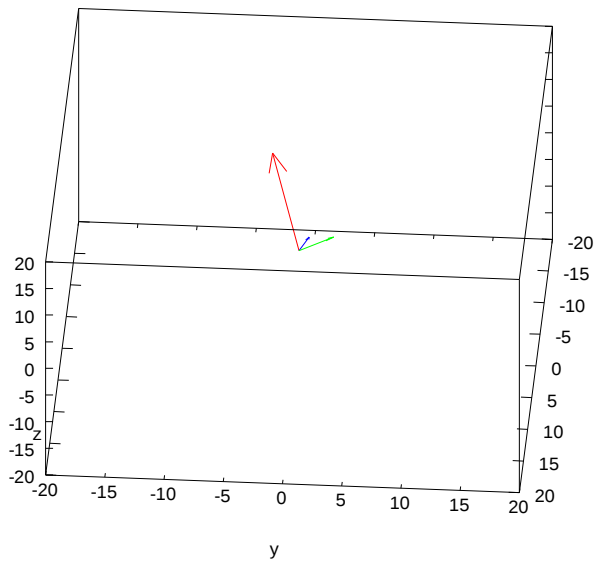
```
%-----  
% 3-d Line Drawing  
% Licensing: This code is distributed under the GNU LGPL license.  
% Modified: 2012.08.31  
% Author: Young W. Lim  
%-----  
  
clf  
t = -1: 0.1 : 1;  
x = 2 -3*t;  
y = -1 -7*t;  
z = 8 +11*t;  
plot3(x, y, z);  
axis([-10, 10, -10, 10, -10, 10])  
hold on  
h1=quiver3( 0, 0, 0, 2, -1, 8);  
set(h1, "color", "red");  
h2=quiver3( 0, 0, 0, 5, 6, -3);  
set(h2, "color", "green");  
xlabel("x");  
ylabel("y");  
zlabel("z");  
view(103, 20);
```

Plane Equation

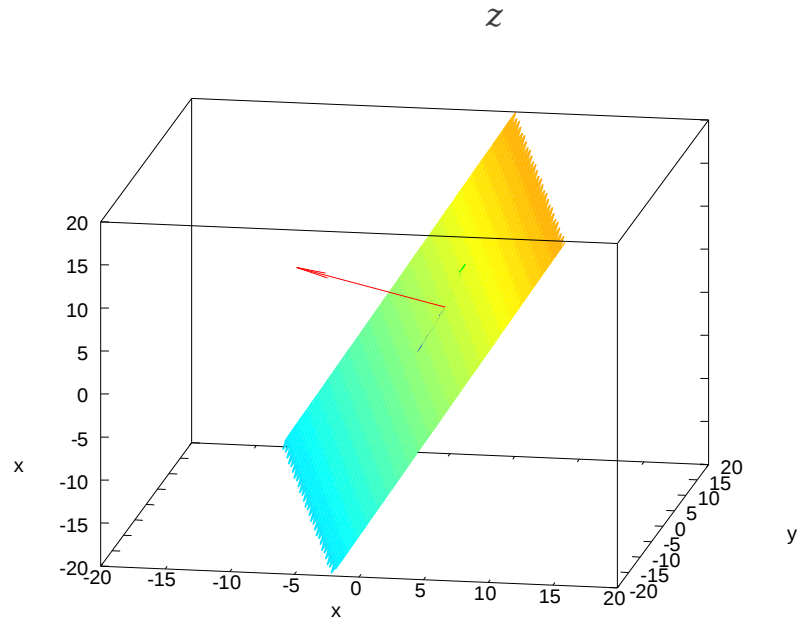
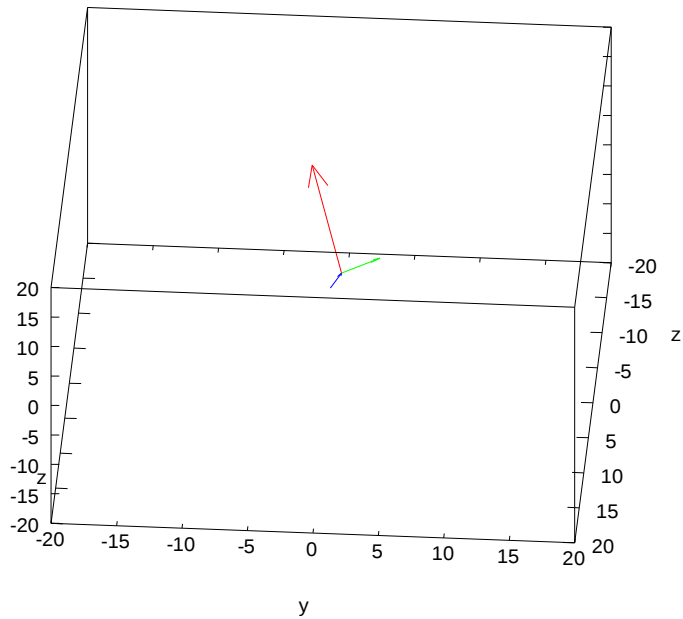
Plane Equation of 3 points $(1, 0, -1)$ $(3, 1, 4)$ $(2, -2, 0)$

$$(2, 1, 5) \times (1, 3, 4) = (-11, -3, 5)$$

$$(2, 1, 5) \times (1, -2, 1) = (11, 3, -5)$$



Plane Equation Plotting



Right Hand Rule

```
%-----  
% 3-d Plane Drawing  
% Licensing: This code is distributed under the GNU LGPL license.  
% Modified: 2012.08.31  
% Author: Young W. Lim  
%-----  
  
clf  
h1=quiver3( 1, 0, -1, 2, 1, 5);  
set(h1, "color", "blue");  
hold on  
h2=quiver3( 3, 1, 4, 1, 3, 4);  
set(h2, "color", "green");  
h3=quiver3( 3, 1, 4, -11, -3, +5);  
set(h3, "color", "red");  
axis([-20, 20, -20, 20, -20, 20]);  
tx = ty = linspace (-20, 20, 100);  
[xx, yy] = meshgrid (tx, ty);  
zz = (-11*xx - 3*yy + 16) / (-5.);  
mesh(xx, yy, zz);  
  
xlabel("x");  
ylabel("y");  
zlabel("z");  
view(94, 50);
```

References

- [1] <http://en.wikipedia.org/>
- [2] <http://planetmath.org/>
- [3] M.L. Boas, “Mathematical Methods in the Physical Sciences”
- [4] D.G. Zill, “Advanced Engineering Mathematics”