

```

ClearAll; r=.; r1=.; r2=.; r3=.; x=.; y=.; z=.; x1=.;
x2=.; y1=.; y2=.; x3=.; x4=.; y3=.; y4=.; z1=.; z2=.;
Efd1=.; Efd1x=.; Efd1y=.; Efd2=.; Efd2x=.; q1=.; q2=.; q3=.;
Efd2y=.; Efd3=.; Efd3x=.; Efd3y=.; Etot1=.; Etot2=.; Etot3=.;
Etot1x=.; Etot1y=.; Efd3=.; Etot2x=.; Etot2y=.; Etot2z=.;

```

(* Electric field due to single charge *)

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r = {x, y, z}; r1 = {x1, y1, z1}; (* define the position vector,
r is the position where field is calculated
and r1 is the position of charge particle*)

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$$Efd1[r_ , r1_ , q1_] := q1 \frac{(r - r1)}{((r - r1) \cdot (r - r1))^{\frac{3}{2}}}$$

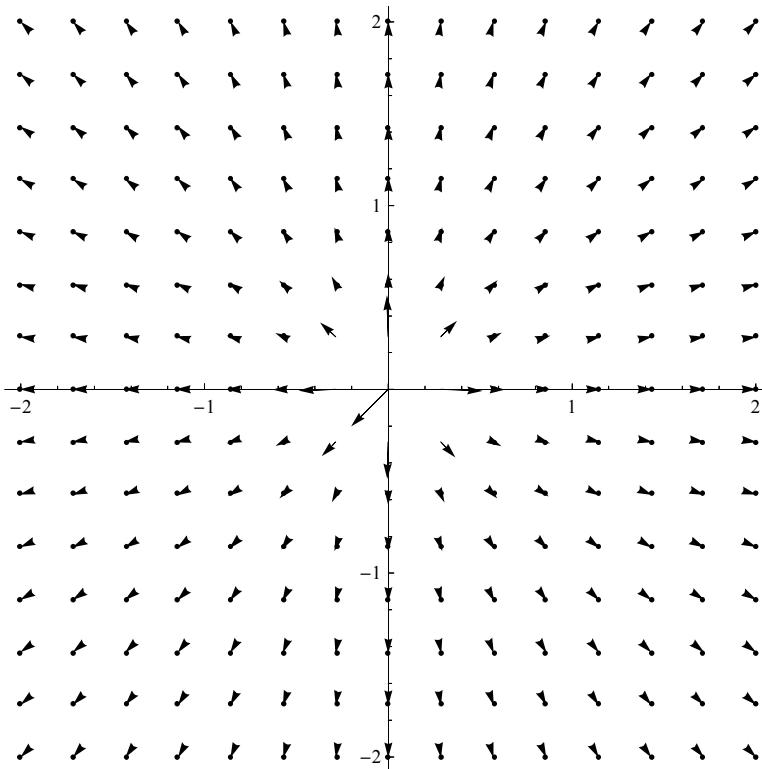
(* Field due to charge one is depend the location r where field is calculated, location of charge particle r1 and magnitude of charge particle q1 *)

(* Run and check output of Efd1[{x,y,0},{1,1,0},2]*)

```
{Efd1x, Efd1y} = Take[Efd1[{x, y, 0}, {0.01, 0.01, 0.1}, 2], 2];
```

(* where Take[list,n] takes the first n elements of list and makes a new choosing components of list from them. The left-hand side is the name we have chosen for the a vector using Take two-dimensional electric field *)

```
PlotVectorField[{Efd1x, Efd1y}, {x, -2, 2}, {y, -2, 2}, Axes -> True]
```

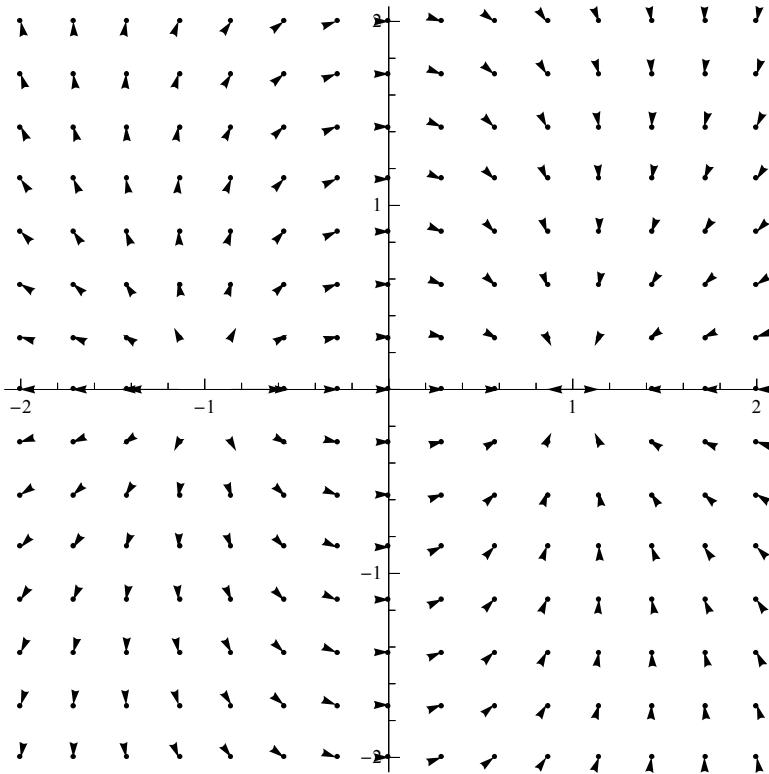


(* Electric field due to two charges *)

```

r2 = {x2, y2, z2}; (*location of second charge*)
Efd2[r_, r2_, q2_] := q2  $\frac{(r - r2)}{((r - r2) \cdot (r - r2))^{\frac{3}{2}}}$  (*Manitude of second charge is q2*)
Etotl[r_, r1_, r2_, q1_, q2_] := Efd1[r, r1, q1] + Efd2[r, r2, q2]
(*total field will be the sum of the indivisual*)
{Etotlx, Etotly} = Take[Etotl[{x, y, 0}, {-1, 0, 0}, {1, 0, 0}, 1, -1], 2];
PlotVectorField[{Etotlx, Etotly}, {x, -2, 2}, {y, -2, 2}, Axes -> True]

```

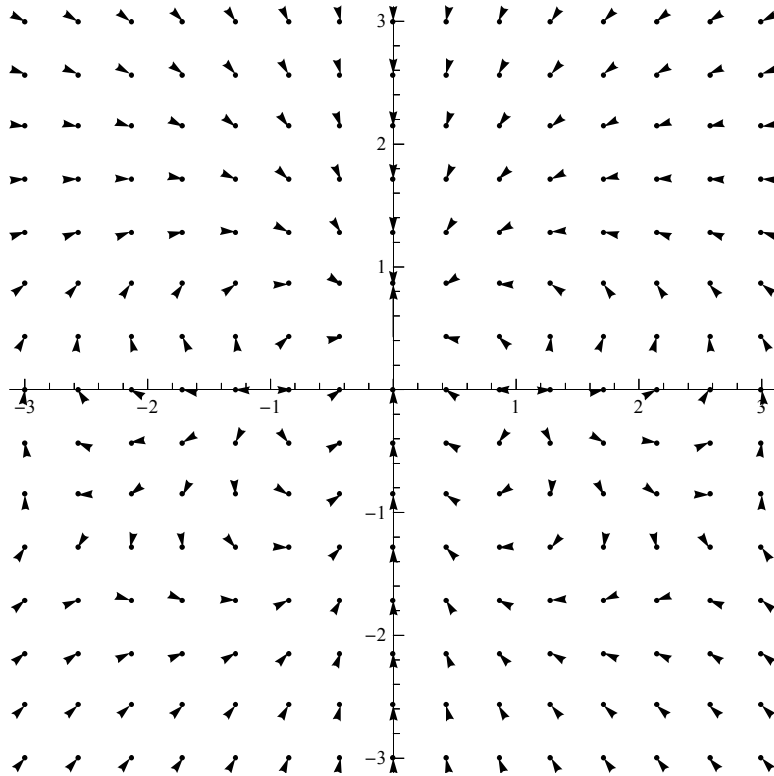


```
(* Electric field due to three charges *)
```

```

r3 = {x3, y3, z3}; (*location of second charge*)
Efd3[r_, r3_, q3_] := q3  $\frac{(r - r3)}{((r - r3) \cdot (r - r3))^{\frac{3}{2}}}$ 
(* Manitude of second charge is q3 *)
Etot2[r_, r1_, r2_, r3_, q1_, q2_, q3_] :=
  Efd1[r, r1, q1] + Efd2[r, r2, q2] + Efd3[r, r3, q3]
(*total field will be the sum of the indivisual*)
{Etot2x, Etot2y} =
  Take[Etot2[{x, y, 0}, {-1, 0, 0}, {0, 0.5, 0}, {1, 0, 0}, 1, -3, 1], 2];
PlotVectorField[{Etot2x, Etot2y}, {x, -3, 3}, {y, -3, 3}, Axes -> True]

```



(**)

```
<<<< Graphics/PlotField3D.m
```

General::obspkg :

Graphics`PlotField3D` is now obsolete. The legacy version being loaded may conflict with current
Mathematica functionality. See the Compatibility Guide for updating information. >>

Get::string : String expected at position 1 in Get[Null]. >>

Get[Null]

```
{Etot2x, Etot2y, Etot2z} =  
  Etot2[{x, y, z}, {-1, 0, 0}, {0, 0.5, 0}, {1, 0, 0}, 1, -3, 1];  
VectorPlot3D[{Etot2x, Etot2y, Etot2z}, {x, -1, 1}, {y, -0.5, 0.5}, {z, -0.1, 0.1},  
  Axes → True, VectorStyle → "Arrow3D", VectorScale → 0.1, PlotRange → All]
```

