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> restart
> with(plots) :
> with(linalg) :
> with(plottools) :
> r1 := vector(2, [0, 5])
                                r1 := [ 0 5 ] (1)
> r2 := vector(2, [0, -5])
                                r2 := [ 0 -5 ] (2)
> Q1 := 3·10-9
                                Q1 :=  $\frac{3}{1000000000}$  (3)
> Q2 := -3·10-9
                                Q2 :=  $-\frac{3}{1000000000}$  (4)
> E1 := (x, y) → evalm(  $\frac{Q1}{4 \cdot \text{Pi} \cdot 8.85 \cdot 10^{-12} \cdot \text{norm}(\text{vector}(2, [x, y]) - r1)^3} \cdot (\text{vector}(2, [x, y]) - r1)$  )
> E1 := (x, y) → evalm(  $\frac{Q1 \frac{1}{4} (\text{linalg}:-\text{vector}(2, [x, y]) - r1)}{\pi \cdot 8.85 \frac{1}{1000000000000} \text{linalg}:-\text{norm}(\text{linalg}:-\text{vector}(2, [x, y]) - r1)^3}$  ) (5)
> E2 := (x, y) → evalm(  $\frac{Q2}{4 \cdot \text{Pi} \cdot 8.85 \cdot 10^{-12} \cdot \text{norm}(\text{vector}(2, [x, y]) - r2)^3} \cdot (\text{vector}(2, [x, y]) - r2)$  )
> E2 := (x, y) → evalm(  $\frac{Q2 \frac{1}{4} (\text{linalg}:-\text{vector}(2, [x, y]) - r2)}{\pi \cdot 8.85 \frac{1}{1000000000000} \text{linalg}:-\text{norm}(\text{linalg}:-\text{vector}(2, [x, y]) - r2)^3}$  ) (6)
> E := (x, y) → E1(x, y) + E2(x, y)
                                E := (x, y) → E1(x, y) + E2(x, y) (7)
> f := fieldplot(normalize(E(x, y)), x=-10..10, y=-10..10, arrows = slim)
                                f := PLOT(...) (8)
> CQ1 := plottools[circle]( [r1[1], r1[2]], 0.2, thickness=3, color=red) :
> CQ2 := plottools[circle]( [r2[1], r2[2]], 0.2, thickness=3, color=blue) :
> display( [f, CQ1, CQ2], style=patch)

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