

Examples of "homogeneous" first order DEs, $y'=F(y/x)$ (Anything common about the direction fields?)

- (1) $y'=-y/x$
- (2) $y'=3(y/x)-(y/x)^2$
- (3) $y'=- (y+2x)/(x+2y)$

```
> De1:=diff(y(x),x)=-y(x)/x;
```

$$De1 := \frac{d}{dx} y(x) = -\frac{y(x)}{x} \quad (1)$$

```
> De2:=diff(y(x),x)=3*y(x)/x - (y(x)/x)^2;
```

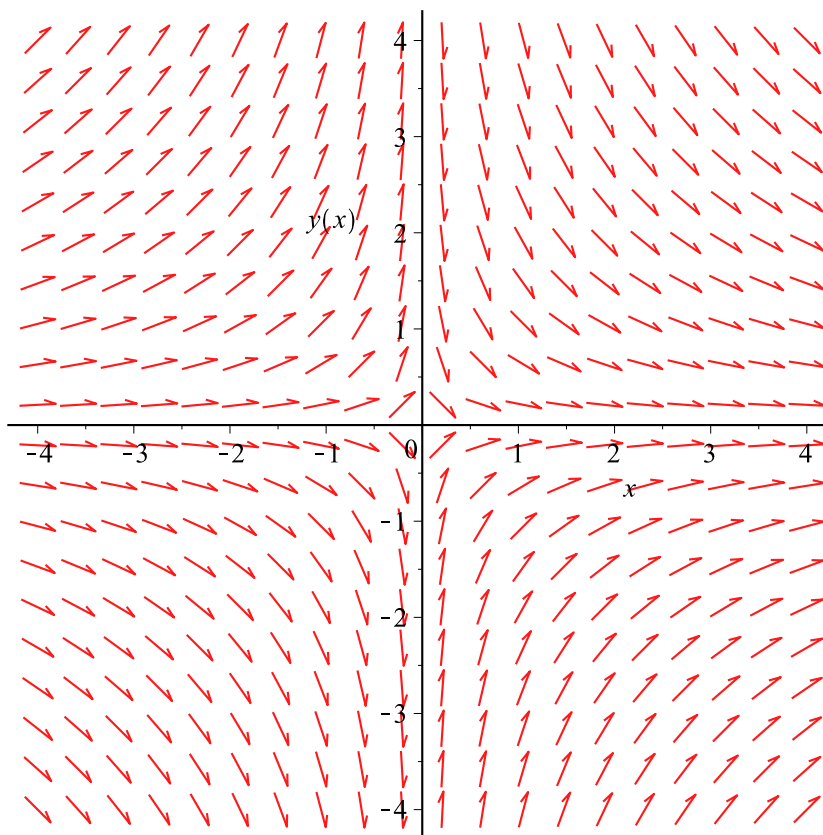
$$De2 := \frac{d}{dx} y(x) = \frac{3y(x)}{x} - \frac{y(x)^2}{x^2} \quad (2)$$

```
> De3:=diff(y(x),x)=- (y(x)+2*x)/(x+2*y(x));
```

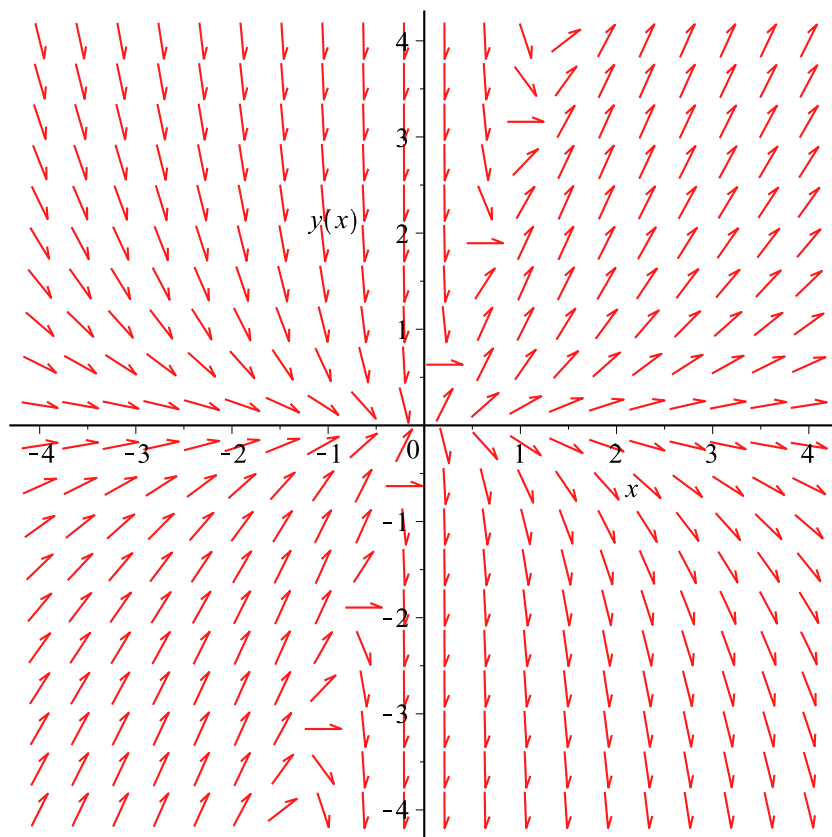
$$De3 := \frac{d}{dx} y(x) = -\frac{y(x) + 2x}{x + 2y(x)} \quad (3)$$

```
> with(DEtools):
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```
> DEplot(De1,y(x),x=-4..4,y=-4..4);
```



```
> DEplot(De2,y(x),x=-4..4,y=-4..4);
```



```
> DEplot(De3,y(x),x=-4..4,y=-4..4);
```

