

Stresses around an edge dislocation

Maple solution from Airy stress function

```
> Phi := (1/2)*y*ln(x^2+y^2);
```

$$\Phi := \frac{1}{2} y \ln(x^2 + y^2)$$

Obtain stresses by differentiation

```
> sigma[x] := simplify(diff(Phi, y, y));
```

$$\sigma_x := \frac{y(3x^2 + y^2)}{(x^2 + y^2)^2}$$

```
> sigma[y] := simplify(diff(Phi, x, x));
```

$$\sigma_y := \frac{y(-x^2 + y^2)}{(x^2 + y^2)^2}$$

```
> tau[xy] := simplify(diff(Phi, x, y));
```

$$\tau_{xy} := -\frac{x(-x^2 + y^2)}{(x^2 + y^2)^2}$$

Plot of shear stress:

```
> plot3d(tau[xy], x=-1..1, y=-1..1);
```

