

```
In[2]:= xx = {x1, x2}
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Out[2]= {x1, x2}
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In[3]:= yy = {y1, y2}
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Out[3]= {y1, y2}
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In[4]:= nx = {nx1, nx2}
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Out[4]= {nx1, nx2}
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In[5]:= ny = {ny1, ny2}
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Out[5]= {ny1, ny2}
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In[6]:= Mag[xx_, yy_] := Sqrt[Total[(xx - yy)^2]]
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In[24]:= db1 = ny.Grad[-Log[Mag[xx + r (1 - t) nx, yy]] / (2 Pi), yy]
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Out[24]= 
$$\frac{ny1 (nx1 r (1 - t) + x1 - y1)}{2 \pi \left( (nx1 r (1 - t) + x1 - y1)^2 + (nx2 r (1 - t) + x2 - y2)^2 \right)} + \frac{ny2 (nx2 r (1 - t) + x2 - y2)}{2 \pi \left( (nx1 r (1 - t) + x1 - y1)^2 + (nx2 r (1 - t) + x2 - y2)^2 \right)}$$

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In[25]:= s := Normal[Series[db1, {t, 0, 3}]]
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In[26]:= sred = Simplify[s /. { (nx1 r + x1 - y1)^2 + (nx2 r + x2 - y2)^2 → d, (nx1 r + x1 - y1) → d1, (nx2 r + x2 - y2) → d2 }]
```

```
Out[26]= 
$$\frac{1}{2 d^4 \pi} \left( 8 (d1 nx1 + d2 nx2)^3 (d1 ny1 + d2 ny2) r^3 t^3 + d^3 (d1 ny1 + d2 ny2 - (nx1 ny1 + nx2 ny2) r t) + \right. \\ \left. d^2 r t (-2 d1 nx1 - 2 d2 nx2 + (nx1^2 + nx2^2) r t) (-d1 ny1 - d2 ny2 + (nx1 ny1 + nx2 ny2) r t) + 4 d (d1 nx1 + d2 nx2) r^2 t^2 \right. \\ \left. (d1^2 nx1 ny1 + d1 (d2 (nx2 ny1 + nx1 ny2) - (2 nx1^2 ny1 + nx2^2 ny1 + nx1 nx2 ny2) r t) + d2 (d2 nx2 ny2 - (nx1 nx2 ny1 + nx1^2 ny2 + 2 nx2^2 ny2) r t) \right)$$

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In[27]:= pw = PageWidth /. Options[$Output];
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SetOptions[$Output, PageWidth → Infinity];
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FortranForm[sred]
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SetOptions[$Output, PageWidth → pw];
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Out[29]//FortranForm=
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(8*(d1*nx1 + d2*nx2)**3*(d1*ny1 + d2*ny2)*r**3*t**3 + d**3*(d1*ny1 + d2*ny2 - (nx1*ny1 + nx2*ny2)*r*t) + d**2*r*t*(-2*d1*nx1 -
2*d2*nx2 + (nx1**2 + nx2**2)*r*t)*(-(d1*ny1) - d2*ny2 + (nx1*ny1 + nx2*ny2)*r*t) + 4*d*(d1*nx1 + d2*nx2)*r**2*t**2*(d1**2*nx1*ny1
+ d1*(d2*(nx2*ny1 + nx1*ny2) - (2*nx1**2*ny1 + nx2**2*ny1 + nx1*nx2*ny2)*r*t) + d2*(d2*nx2*ny2 - (nx1*nx2*ny1 + nx1**2*ny2 +
2*nx2**2*ny2)*r*t)))/(2.*d**4*Pi)
```