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(%i1) kill(all);
(%o0) done

(%i1) assume(c>0);
(%o1) [c>0]

(%i2) g_x: M*G/(gamma*r^3)*((x_d*y_d*y+x*x_d^2)/c^2-x);
(%o2) 
$$\frac{GM \left( \frac{x_d y_d y + x x_d^2}{c^2} - x \right)}{r^3 \Gamma}$$


(%i3) g_y: M*G/(gamma*r^3)*((y_d*x_d*x+y*y_d^2)/c^2-y);
(%o3) 
$$\frac{GM \left( \frac{y_d x_d x + y y_d^2}{c^2} - y \right)}{r^3 \Gamma}$$


(%i4) gamma: 1/sqrt(1-(x_d^2+y_d^2)/c^2);
(%o4) 
$$\frac{1}{\sqrt{1 - \frac{y_d^2 + x_d^2}{c^2}}}$$


(%i5) r: sqrt(x^2+y^2);
(%o5) 
$$\sqrt{y^2 + x^2}$$


(%i6) divg: diff(g_x,x)+diff(g_y,y);
(%o6) 
$$\frac{GM \left( \frac{y_d^2}{c^2} - 1 \right)}{r^3 \Gamma} + \frac{GM \left( \frac{x_d^2}{c^2} - 1 \right)}{r^3 \Gamma}$$


(%i7) factor(%);
(%o7) 
$$\frac{GM (y_d^2 + x_d^2 - 2 c^2)}{c^2 r^3 \Gamma}$$


(%i8) ev(divg);
(%o8) 
$$\frac{GM \left( \frac{y_d^2}{c^2} - 1 \right) \sqrt{1 - \frac{y_d^2 + x_d^2}{c^2}}}{(y^2 + x^2)^{3/2}} + \frac{GM \left( \frac{x_d^2}{c^2} - 1 \right) \sqrt{1 - \frac{y_d^2 + x_d^2}{c^2}}}{(y^2 + x^2)^{3/2}}$$


(%i9) dg1: factor(%);
(%o9) 
$$\frac{GM \sqrt{-y_d^2 - x_d^2 + c^2} (y_d^2 + x_d^2 - 2 c^2)}{c^3 (y^2 + x^2)^{3/2}}$$


check alternative form of expression;;

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(%i10) dg2: (G*M*((y_d^2+x_d^2)/c^2-2))/(r^3*gamma);
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(%o10) 
$$\frac{GM \sqrt{1 - \frac{y_d^2 + x_d^2}{c^2}} \left( \frac{y_d^2 + x_d^2}{c^2} - 2 \right)}{(y^2 + x^2)^{3/2}}$$

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(%i11) ratsimp(dg1-dg2);
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(%o11) 0
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