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> #  R. Gilmore
> #  The generating function for Hermite polynomials is Taylor
expanded,
> #  truncated at some finite order, and converted to a polynomial.
> #  The succesive derivatives are taken and evaluated at t=0.
> #  The results are printed as the successive Hermite polynomials.
> #restart;
> GenHer:=exp(2*x*t-t^2);
```

$$GenHer := e^{2\,xt-t^2}$$

```
> nn:=10;
```

$$nn := 10$$

```
> h:=taylor(GenHer,t=0,nn+2);
```

$$+\left(-1/3\,x+2/3\,x^3-\tfrac{4}{15}\,x^5+\tfrac{8}{315}\,x^7\right)t^7 mbox+\left(1/24-1/3\,x^2+1/3\,x^4-\tfrac{4}{45}\,x^6+\tfrac{2}{315}\,x^8\right)t^8+\left(1/12\,x-2/9\,x^3+2/15\,x^5-\tfrac{8}{315}\,x^7+\tfrac{4}{2835}\,x^9\right.$$

```
> hh:=convert(h,polynom);
```

$$\left.\right)t^6+\left(-1/3\,x+2/3\,x^3-\tfrac{4}{15}\,x^5+\tfrac{8}{315}\,x^7\right)t^7 mbox+\left(1/24-1/3\,x^2+1/3\,x^4-\tfrac{4}{45}\,x^6+\tfrac{2}{315}\,x^8\right)t^8+\left(1/12\,x-2/9\,x^3+2/15\,x^5-\tfrac{8}{315}\,x^7+\right.$$

```
> hh:=taylor(GenHer,t=0,nn+2):H[0]:=subs(t=0,hh):print(0,H[0]);for
i from 1 to nn do hh:=diff(hh,t):H[i]:=subs(t=0,hh):print(i,H[i]):od:
```

$0,\ 1$
$1,\ 2\,x$
$2,\ -2+4\,x^2$
$3,\ -12\,x+8\,x^3$
$4,\ 12-48\,x^2+16\,x^4$
$5,\ 120\,x-160\,x^3+32\,x^5$
$6,\ -120+720\,x^2-480\,x^4+64\,x^6$
$7,\ -1680\,x+3360\,x^3-1344\,x^5+128\,x^7$
$8,\ 1680-13440\,x^2+13440\,x^4-3584\,x^6+256\,x^8$
$9,\ 30240\,x-80640\,x^3+48384\,x^5-9216\,x^7+512\,x^9$
$10,\ -30240+302400\,x^2-403200\,x^4+161280\,x^6-23040\,x^8+1024\,x^{10}$