

```
> restart;
> c:=s->c1*s+c2*s^2;
```

$$c := s \rightarrow c1 s + c2 s^2 \quad (1)$$

```
> d:=p->a0-a1*p;
```

$$d := p \rightarrow a0 - a1 p \quad (2)$$

```
> x1:=p2e-p1=diff(c(s0-d(p1)),s0);
```

$$x1 := p2e - p1 = c1 + 2 c2 (s0 - a0 + a1 p1) \quad (3)$$

```
> x2:=p2=solve(d(p2)=y2+s0-d(p1),p2);
```

$$x2 := p2 = \frac{-y2 - s0 + 2 a0 - a1 p1}{a1} \quad (4)$$

```
> x3:=p2e=q*subs(y2=yh,op(2,x2))+(1-q)*subs(y2=0,op(2,x2));
```

$$x3 := p2e = \frac{q (-yh - s0 + 2 a0 - a1 p1)}{a1} + \frac{(1 - q) (-s0 + 2 a0 - a1 p1)}{a1} \quad (5)$$

```
> x4:=p1=collect(solve(subs(x3,x1),p1),[c1,a0]);
factor(op([2,2],%));
```

$$x4 := p1 = -\frac{1}{2} \frac{c1}{c2 a1 + 1} + \frac{1}{2} \frac{(2 c2 a1 + 2) a0}{a1 (c2 a1 + 1)} + \frac{1}{2} \frac{-s0 - 2 c2 a1 s0 - q yh}{a1 (c2 a1 + 1)} \quad (6)$$

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> diff(x4,q);
```

$$0 = -\frac{1}{2} \frac{yh}{a1 (c2 a1 + 1)} \quad (7)$$

```
> parms:=a0=10,a1=1,c1=1,c2=1/10,s0=5,yh=5;
```

$$parms := a0 = 10, a1 = 1, c1 = 1, c2 = \frac{1}{10}, s0 = 5, yh = 5 \quad (8)$$

```
> plot(subs(parms,subs(x4,[op(2,x3),op(2,x4),subs(y2=yh,op(2,x2)),
subs(y2=0,op(2,x2))])),q=0..1);
```

