20e. Computations for Lemma 4.15

In[ ]:=
```
Clear[kp, s, eps]
muups = (1 / 2 + kp + s ≤ 0)
muom = (1 / 2 - kp + s ≤ 0)
```

Out[ ]= $\frac{1}{2} + kp + s \leq 0$

Out[ ]= $\frac{1}{2} - kp + s \leq 0$

Part i)

$\varepsilon = 1$

In[ ]:=
```
muups /. s → nu / 2 /. kp → -Max[p, m0[j]] - (j + 1) / 2 // Simplify
```

Out[ ]= nu ≤ j + 2 Max[p, m0[j]]

$\varepsilon = -1$

In[ ]:=
```
muups /. s → nu / 2 /. kp → -m0[j] - (-j + 1) / 2 // Simplify
```

Out[ ]= j + nu ≤ 2 m0[j]

Part ii)

$\varepsilon = 1$

In[ ]:=
```
muups /. s → nu / 2 /. kp → -m0[j] - (j + 1) / 2 // Simplify
```

Out[ ]= nu ≤ j + 2 m0[j]

$\varepsilon = -1$

In[ ]:=
```
muups /. s → nu / 2 /. kp → -Max[m0[j], p] - (-j + 1) / 2 // Simplify
```

Out[ ]= j + nu ≤ 2 Max[p, m0[j]]

Part iii)

$\varepsilon = 1$

In[ ]:=
```
muom /. s → nu / 2 /. kp → -Max[m0[j], p] - (j + 1) / 2 // Simplify
```

Out[ ]= 2 + j + nu + 2 Max[p, m0[j]] ≤ 0

$\varepsilon = -1$

In[ ]:=
```
muom /. s → nu / 2 /. kp → -m0[j] - (-j + 1) / 2 // Simplify
```

Out[ ]= 2 + nu + 2 m0[j] ≤ j

Part iv)

$\varepsilon = 1$

In[ ]:=
```
muom /. s → nu / 2 /. kp → -m0[j] - (j + 1) / 2 // Simplify
```

Out[ ]=
```
2 + j + nu + 2 m0[j] ≤ 0
```

$\varepsilon = -1$

In[ ]:=
```
muom /. s → nu / 2 /. kp → -Max[m0[j], p] - (-j + 1) / 2 // Simplify
```

Out[ ]=
```
2 + nu + 2 Max[p, m0[j]] ≤ j
```