EJERCICIO 5

Nodos uniformemente distribuidos

```
(%i1) nodos1:makelist(-1 + 2*i/8, i, 0, 8);
```

$$(\text{nodos1}) \qquad [-1, -\frac{3}{4}, -\frac{1}{2}, -\frac{1}{4}, 0, \frac{1}{4}, \frac{1}{2}, \frac{3}{4}, 1]$$

```
(%i2) f(x):=2*abs(x)+1;
```

$$(\%\ \text{o2}) \qquad \text{f}(x) := 2\,|x| + 1$$

```
(%i3) imagenes1:makelist(f(nodos1[i]), i, 1, 9);
```

$$(\text{imagenes1}) \qquad [3, \frac{5}{2}, 2, \frac{3}{2}, 1, \frac{3}{2}, 2, \frac{5}{2}, 3]$$

```
(%i4) l1(i,x):=product((x-nodos1[j])/(nodos1[i]-nodos1[j]),j,1,i-1)*product((x-
nodos1[j])/(nodos1[i]-nodos1[j]),j,i+1,9);
```

$$(\%\ \text{o4}) \qquad \text{l1}\,(i,x) := \prod_{j=1}^{i-1} \frac{x - nodos1_{\,j}}{nodos1_{\,i} - nodos1_{\,j}} \prod_{j=i+1}^{9} \frac{x - nodos1_{\,j}}{nodos1_{\,i} - nodos1_{\,j}}$$

```
(%i5) p1(x):=sum(imagenes1[i]*l1(i, x), i, 1, 9);
```

$$(\%\ \text{o5}) \qquad \text{p1}(x) := \sum_{i=1}^{9} imagenes1_{\,i}\,\text{l1}\,(i,x)$$

Nodos de Chebyshev

```
(%i6) nodos2:makelist(cos((2*i+1)*%pi/18), i, 0, 8);
```

$$(\text{nodos2}) \qquad [\cos\left(\frac{\pi}{18}\right), \frac{\sqrt{3}}{2}, \cos\left(\frac{5\pi}{18}\right), \cos\left(\frac{7\pi}{18}\right), 0, \cos\left(\frac{11\pi}{18}\right), \cos\left(\frac{13\pi}{18}\right), -\frac{\sqrt{3}}{2}, \cos\left(\frac{17\pi}{18}\right)]$$

```
(%i7) imagenes2:makelist(f(nodos2[i]), i, 1, 9);
```

$$(\text{imagenes2}) \qquad [2\cos\left(\frac{\pi}{18}\right)+1, \sqrt{3}+1, 2\cos\left(\frac{5\pi}{18}\right)+1, 2\cos\left(\frac{7\pi}{18}\right)+1, 1, 1-2\cos\left(\frac{11\pi}{18}\right), 1-2\cos\left(\frac{13\pi}{18}\right),$$

$$\sqrt{3}+1, 1-2\cos\left(\frac{17\pi}{18}\right)]$$

→ l2(i,x):=product((x-nodos2[j])/(nodos2[i]-nodos2[j]),j,1,i-1)*product((x-nodos2[j])/(nodos2[i]-nodos2[j]),j,i+1,9);

(% o8) $$\mathrm{l2}\left(i,x\right) := \prod_{j=1}^{i-1} \frac{x - nodos2_j}{nodos2_i - nodos2_j} \prod_{j=i+1}^{9} \frac{x - nodos2_j}{nodos2_i - nodos2_j}$$

→ p2(x):=sum(imagenes2[i]*l2(i, x), i, 1, 9);

(% o9) $$\mathrm{p2}(x) := \sum_{i=1}^{9} imagenes2_i \, \mathrm{l2}\left(i,x\right)$$

→ wxplot2d([f(x), p1(x), p2(x)], [x,-1,1])$

(% t10)