Sloppy monomials

```
f[x_] := Sin[π (2 x)]
M := 5
fTaylor[x_] = Series[...] // Normal // N // Chop
```

$$fChebyshev[x\_] = 0.0066 + 5.652\,x + 9.701\,x^2 - 95.455\,x^3 + 133.48\,x^4 - 53.39\,x^5$$

$$fLegendre[x\_] = 0.016 + 5.410\,x + 11.304\,x^2 - 99.637\,x^3 + 138.15\,x^4 - 55.26\,x^5$$

```
Plot[{f[x], fChebyshev[x], ...}, {x, 0, 1}]
Plot[{...}, {x, 0, 1}]
Plot[{...}, ...]

H[n_, m_] := ...
Ham[M_] = Table[H[n, m] // N, ...];
{vals5, vecs5} = Eigensystem[Ham[M]];
conditionNumber = ...
ratios = ...

sloppiest = ...;  (* Is it the first row or the first column? *)
sloppyPolynomial[x_] := Sum[... x^n, {n, 0, M}]
sloppyPolynomial[x]
Plot[...]
```