Monomial interpolation

In [3]:

```
#keep
import numpy as np

import numpy.linalg as la
import matplotlib.pyplot as pt
%matplotlib inline
```

In [4]:

```
#keep
x = np.linspace(0, 1, 200)
```

Now plot the monomial basis on the interval [0,1] up to x^9.

In [5]:

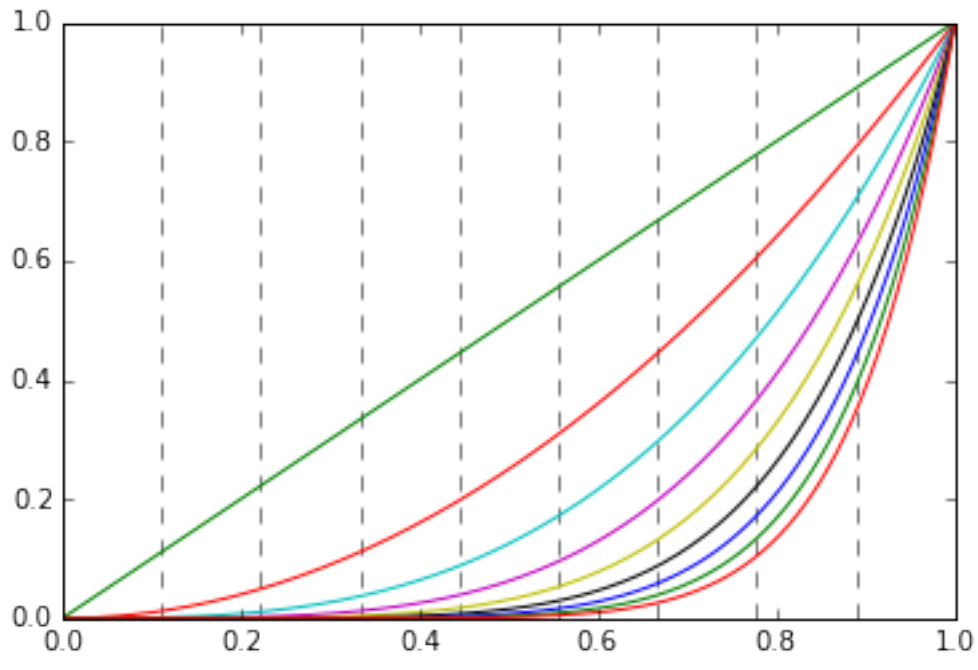
```
#keep
n = 10

for i in range(n):
    pt.plot(x, x**i)

pt.vlines(np.linspace(0, 1, n), 0, 1, alpha=0.5, linestyle="--")
```

Out[5]:

```
<matplotlib.collections.LineCollection at 0x10564e160>
```



- How do the entries of the Vandermonde matrix relate to this plot?

- Guess the condition number of the Vandermonde matrix for $n = 5, 10, 20$:

In [6]:

```
#keep
n = 5

V = np.array([np.linspace(0, 1, n)**i for i in range(n)]).T
la.cond(V)
```

Out[6]:

```
686.43494181859796
```

In [ ]:

```

```