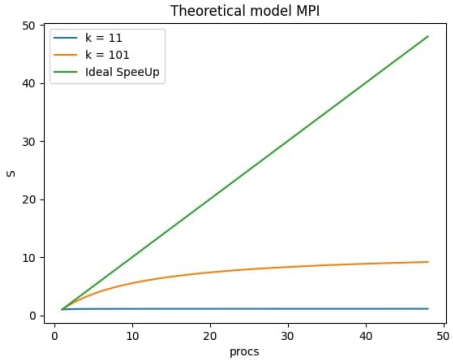
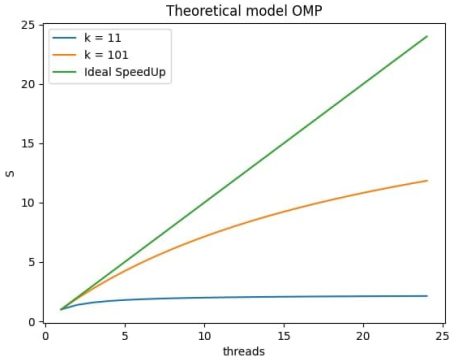
PERFORMANCE MODEL

After analysing the code for both MPI/openMP implementations of the `blur` program I obtained these two theoretical models from which, by expliciting the values of the time parameters, I was able to plot the scalability curves for both sizes of the kernel: 11 and 101. The models are the following:

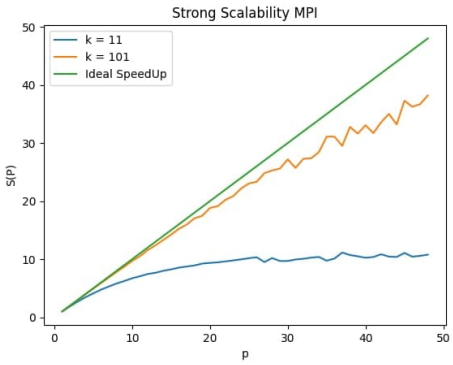
$$\texttt{openMP}: \quad T_{threads} = \underbrace{\frac{R \times C \times T_{read}}{threads}}_{\text{threads read the image}} + \underbrace{\frac{k\_size^2 \times R \times C \times T_{comp}}{threads}}_{\text{threads blur the image}} + \underbrace{R \times C \times T_{write}}_{\text{the master writes back}}$$

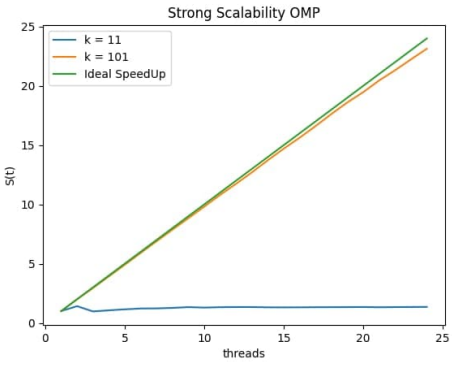
$$\texttt{MPI}: \quad T_P = \underbrace{R \times C \times T_{read}}_{\text{master reads the image}} + \underbrace{R \times C \times 2T_{comm}}_{\text{communications time}} + \underbrace{\frac{k\_size^2 \times R \times C \times T_{comp}}{P}}_{\text{procs blur the image}} + \underbrace{R \times C \times T_{write}}_{\text{master writes the image}}$$





Now we can compare them with the real results obtained:





TIMING

Reference times for both version of the *blur* programm for both sizes. All the results reported come from executing the codes on 1 core/thread.

	MPI	OMP
SIZE 11	76.944897	84.823136
SIZE 101	5800.945617	5872.344429