Numerical Jacobian (forward difference)

input : function $\{f\} : \mathbb{R}^n \to \mathbb{R}^n$, point $\{x\}$, step size h
output: approximation $[J]$ of the Jacobian at $\{x\}$, $J_{ij} \approx \partial f_i / \partial x_j$

$\{f\}_0 \leftarrow \{f(\{x\})\}$
for $j \leftarrow 1$ **to** n **do**
  $\{e_j\} \leftarrow$ unit vector in the j direction // jth column of $[I]$
  $[J][:, j] \leftarrow \dfrac{\{f(\{x\} + h\,\{e_j\})\} - \{f\}_0}{h}$ // jth column of $[J]$
end
return $[J]$