> $a := \mathbf{proc}(k)\, \frac{k!}{k^k - k}$: **end proc**:

> $p := \mathbf{proc}(k, n)$ **option** *remember*: **if** $n \leq 1$ **then** 0 : **else** $q := \mathrm{floor}\left(\frac{n}{k}\right) : r := n - k \cdot q : (q+1)^r \cdot q^{k-r}$: **fi**: **end proc**:

> $g := \mathbf{proc}(k, \mathit{ErdosHajnaln})$ **option** *remember*: **if** $n \leq 1$ **then** 0 : **else** $q := \mathrm{floor}\left(\frac{n}{k}\right) : r := n - k \cdot q : r \cdot g(k, q+1) + (k-r) \cdot g(k, q) + p(k, n)$: **fi**: **end proc**:

>

> *### FUNCTION z_k AS DEFINED IN SECTION 3 ###############*

> $z := \mathbf{proc}(k)\ \mathit{fsolve}\left(\_z^{k-1} + (1 - \_z)^{k-1} = \frac{(k-1)^{k-1}}{k^{k-1} - 1} \right)[1]$: **end proc**:

> $z(4); z(5); z(6);$

>

> *#### LAST STEP IN THE PROOF OF THEOREM 3.1 #########*

> $f := \mathbf{proc}(k)\, \frac{(k^k - k)}{2 \cdot (k-2)} \cdot \left(\frac{\text{`if`}(k = 4, 0.257, \text{`if`}(k \leq 6, 0.3, 0.5))}{k-2} \right)^{k-2}$: **end proc**:

> $\mathit{seq}(f(k) \leq 1, k = 5..30);$

> $\mathit{p1} := 0.91 :$

> $f(4) \leq \frac{4}{3} \cdot \left(1 - \frac{\mathit{p1}^2}{4}\right);$

> $\mathit{fsolve}\left(a(4) = \frac{8}{9} \cdot (0.26^3 \cdot \_\mathit{p1} + 1 - \_\mathit{p1}) \right) \leq \mathit{p1};$

>

> *####### FUNCTION zprime_{k,n} AS DEFINED IN LEMMA 4.5 ###############*

> $\mathit{zprime} := \mathbf{proc}(k, n)\ \ m := n - \mathrm{ceil}\left(\frac{n}{k}\right) : \mathit{fsolve}\left(\_z^{k-1} + (1 - \_z)^{k-1} = \frac{(k-1)^{k-1}}{k^{k-1}} \cdot \left(1 - \frac{8 \cdot (k-1)^3}{27 \cdot m^2}\right) \right)[1]$: **end proc**:

> $\mathit{zprime}(4, 100) \leq 0.2611; \mathit{zprime}(5, 21) \leq 0.2611;$

>

> *####### PROOF OF LEMMA 4.5 ###################*

> $\mathit{seq}\left(\frac{\mathit{zprime}(k, k \cdot (k-1) + 1)}{2^{2-k}} \geq 1, k = 4..30 \right);$

>

> *####### PROOF OF LEMMA 4.7 ###################*

> $\mathit{eprime} := \mathbf{proc}(k, n)\, \frac{k^3}{n^2}$: **end proc**:

```
> c :=proc(k) (k-1)^k/(k^k - k) · (1 - eprime(k, k·(k-1) + 1)) - (k-1)·0.27^(k-1) : end
     proc:
> seq(c(k) ≥ 0.14, k = 4 ..30);
>
> ####### THE CASE k=4, n<=100 ###################
> Partitions :=proc(k, n) option remember: if k = 0 and n > 0 then [ ] :  elif n = 0
     then [[0$k]] : elif k = 1 then [[n]] :else [seq(seq([f, op(tau)], tau = select(
     proc(tau) tau[1] ≤ f: end proc, Partitions(k - 1, n - f))), f = 1 ..n)] : fi: end
     proc:
> for n from 13 to 100 do print(n) : if max(seq(add(g(4, tau[i]), i = 1 ..4)
     + add(add(tau[i]·tau[j], j = i + 1 ..4), i = 1 ..3)/2 · (zprime(4, n)/2)^2 · (n - 1)^2,
     tau = Partitions(4, n))) > g(4, n) then print(Bad) : fi: od:
>
> ################## END OF THE PROOF #######################
> p1 := 0.86 :
> A := proc(k) ((k^k - k)·0.2611^(k-2))/((k - 2)^(k-1)) : end proc:
> p1^3 < 0.7 < 1 - eprime(4, 21) ;
> A(5) < 1 < 2·(1 - eprime(5, 21));
> A(4) < 2.15;
> p1^2/4 + 3/8 ·2.15 < 0.992 < 1 - eprime(4, 100);
```