4 The U170 BLAS: Level 1 & 2

- general construction principles: achieve compact code size with high speed:
  - issue loads 8–10 cycles before 1st use (achieves (top-level) cache lookahead)
  - perform minimal innermost loop unrolling to reduce the startup costs
- performance on various computations (with unit stride):
function	effect	U170 BLAS		unrolling	Sun Perf. Lib 1.2		theor. max.
`dgemv()`	$y \leftarrow Ax$	240	(256)	8×2	214	(213)	330
`dger()`	$A \leftarrow A + xy^T$	140	(100)	8×1	121	(100)	165
`dnrm2()`	$(x \cdot x)^{1/2}$	250	(250)	1×8	50	(45)	330
`ddot()`	$x \cdot y$	139	(139)	1×4	54	(45)	165
`daxpy()`	$y \leftarrow \alpha x + y$	97	(78)	1×4	74	(80)	126
`dscal()`	$y \leftarrow \alpha y$	80	(66)	1×4	65	(48)	85
`dcopy()`	$y \leftarrow x$	64	(65)	1×8	78	(81)	85
`dswap()`	$y \leftrightarrow x$	35	(32)	1×4	40	(29)	43
`idamax()`	i s.t. $\lvert x_i \rvert \geq \max_{j=0}^{n-1} \lvert x_j \rvert$	78	(83)	1×5	40	(29)	85
  - A – $n \times n$; x, y – $1 \times n$. Speeds in MFLOPs.
  - n chosen s.t. data size $=$ 16 KB (128 KB)